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Prehistoric and Historic Cultural Resources of Selected Sites at Harlan County Lake, Harlan County, Nebraska

Test Excavations and Determination Of Significance For 28 Sites

Prepared by:
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Junction City, Kansas
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Submitted to:
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PREHISTORIC AND HISTORIC CULTURAL RESOURCES OF SELECTED SITES AT HARLAN COUNTY LAKE, HARLAN COUNTY, NEBRASKA

TEST EXCAVATIONS AND DETERMINATION OF SIGNIFICANCE FOR 28 SITES

Edited by

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1987

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The study performed herein by the Contractor for the Corps of Engineers is called for in the National Historic Preservation Act of 1966 (PL 89-665) as amended by Public Laws 94-422 and 96-515 and is authorized for funding under Public Law 86-523 as amended by Public Law 93-291. Accomplishment of this work provides documentation evidencing compliance with Executive Order 11593 "Protection and Enhancement of the Cultural Environment" dated 13 May 1971, and Section 110 of the National Historic Preservation Act.

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The following report summarizes the archaeological testing of 28 sites for National Register eligibility in Harlan County Lake, Harlan County, Nebraska. Cultural affiliations of the tested sites included a possible Paleo Indian component, Keith varient, Plains Woodland, upper Republican, protohistoric Apache, Dismal River and historic occupations. While several sites were recommended for National Register inclusion, the report presents additional information pertinent to Central Plains prehistory. Such topics include a summary of past climate episodes supplemented with recent geomorphic, palynological and (cont.)

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SECURITY CLASSIFICATION OF THIS PAGE (*When Data Entered*) pedological studies; prehistoric adaptations to the various climatic episodes; a reconstruction of prehistoric subsistence strategies of several cultural periods reflected in the fauna, flora, and phytoliths; and a current overview of the cultural history of the Central Plains, with emphasis on southcentral Nebraska.

Abstract

This report summarizes the archaeological testing of 28 sites for National Register eligibility in Harlan County Lake, Harlan County, Nebraska. The project was funded by the Kansas City District of the U.S. Army Corps of Engineers, DACW41-85-C-0167, in contractual agreement with Kaw Valley Engineering and Development, Inc., of Junction City, Kansas. The objectives of the project were to minimally test 28 sites in order to determine their cultural integrity and potential eligibility for nomination to the National Register of Historic Places. The sites investigated were: Graham Ossuary (25HN5), 25HN6, 25HN12, 25HN14, Sindt Point (25HN16), Stevenson Village (25HN31), 25HN32, 25HN33, 25HN35, 25HN36, White Cat Village (25HN37), 25HN38, Green Plum (25HN39), 25HN40, Indian Hill (25HN42), School District No. 9 (25HN50), 25HN51, 25HN52, 25HN53, 25HN54, 25HN57, 25HN60, 25HN61, 25HN62, 25HN124, 25HN125, North Cove (25HN164) and Buffalo Bill's Cave.

Field investigations included planing cut banks, manual excavation of test units, coring and backhoe trenching. Laboratory analyses focused on stone tools, ceramics, fauna and flora. Work was performed by archaeologists, paleontologists, historians, geomorphologist and palynologist. Results of this work led to the recognition of possible Paleo-Indian, Plains Woodland, Upper Republican and Dismal River occupations in the project area. These occupations are best preserved at five sites. These are the North Cove site (25HN164) which has a deeply buried possibly Paleo-Indian component, 25HN40 which has intact features assigned to the Keith complex, 25HN36 and Graham Ossuary (25HN5) have large quantities of cultural materials representative of the Upper Republican complex, and White Cat Village (25HN37) has intact features assigned to the Dismal River complex.

Forward

The editors would like to acknowledge the contributions by the various authors. Archaeological assistants during the project were Dr. Brad Logan and Marie Brown. Dr. Logan's contributions included ceramic analysis and researching the present environment. Marie Brown's contribution included background research for the culture history of the region and intensive faunal and human osteological analyses. Historical research and documentation was by Daniel Fitzgerald of the Kansas State Historical Society.

Specialized research involving pollen and opal phytoliths were done by Glen Fredlund and Steven Bozarth of the University of Kansas Department of Geography. Paleontological analyses was done by Dr. J. D. Stewart, Curator of Lower Vertebrates at the Los Angeles County Museum, while geomorphology work was conducted by Kevin Cornwell of Geotechnical Services, Inc., of Omaha, Nebraska.

The Principal Investigators of this project, and editors of this report, made contributions in specialized research. Macrofloral identifications and analysis was conducted by Dr. Mary Adair. Lithic analysis was performed by Dr. Kenneth Brown. Site recommendations are the sole responsibility of the editors of this report.

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Thanks go to the field personnel that includes Dr. Brad Logan, Dr. J.D. Stewart, Marie Brown, Jerry William, Bill Ranney, Brian Treffer, Karl Gottsheimer, and Jennifer Story. Special appreciation goes to Paul and Pat Prettyman of Alma, Nebraska, for their unending help and enthusiasm in instructing Kenneth and Marie Brown in the local archaeology. Personnel at the University of Nebraska that deserve special thanks include Dr. Gibson and Dr. Gunnerson of the Department of Anthropology and personnel at the Nebraska State Historical Society, especially John Ludwickson. John Carter of the Nebraska State Historical Society provided assistance in securing copies of photographs from the unprocessed John Champe collection. Dr. Larry Martin and John Simmons of the University of Kansas Museum of Natural History provided assistance in identification of faunal materials.

This project would have not been possible if it were not for the personnel at Kaw Valley Engineering and Development, Inc. Leon Osbourn deserves special thanks for taking a risk in pursuing this cultural resource management project. Field surveyors, cartographers and secretarial personnel associated with Kaw Valley Engineering all deserve special credit and thanks.

The Principal Investigators of this project, and editors of this report, want to thank their families for tolerating our moments of despair and sharing our moments of joy during this project.

Chapter 1

Background and Design of the Data Recovery Project: Harlan County Lake

Mary J. Adair

Introduction

In 1952, the U.S. Army Corps of Engineers constructed an earthen dam over a portion of the Republican River in Harlan County, southcentral Nebraska (Fig. 1). The dam inundated or adversely affected prime farmland, floodplain forests and at least 174 prehistoric and historic archaeological sites (Fig. 2). Prior to dam closure, some of these cultural resources were professionally investigated. Subsequent to the completion of the reservoir several cultural resource management projects were conducted to determine the nature of cultural deposits located within the floodpool level, within adjacent park and recreational areas maintained by the Corps, and along the immediate shoreline of the existing lake. These projects have sought to identify the integrity of these cultural resources and to make recommendations to mitigate further destruction to the properties.

Based on the recommendations provided by these previous projects the U.S. Army Corps of Engineers, Kansas City District made a determination that 28 cultural sites needed additional investigation to determine their eligibility for inclusion in the National Register of Historic Places. In May 1985 the U.S. Army Corps of Engineers, Kansas City District, entered into a contractual agreement with Kaw Valley Engineering and Development, Inc. of Junction City, Kansas for a documentation and testing program designed to recover data necessary to address issues of site size, integrity, cultural affiliation and significance. The research design for the project developed by professional archaeologists with Kaw Valley was approved by the U.S. Army Corps of Engineers and field investigations commenced in July 1985. The data recovery program was designed in accordance with standards set forth in 36CFR66 ("Recovery of Scientific, Prehistoric, Historic, and Archaeological Data: Methods, Standards and Reporting Requirements").

The following report summarizes the program for documentation and testing at the following 28 sites (Fig. 3): Graham Ossuary (25HN5), an Upper Republican burial; 25HN12, a multicomponent Plains Woodland Keith complex and Plains Village Upper Republican complex habitation; Fritzen (25HN14); Sindt Point (25HN16); Stevenson Village (25HN31),

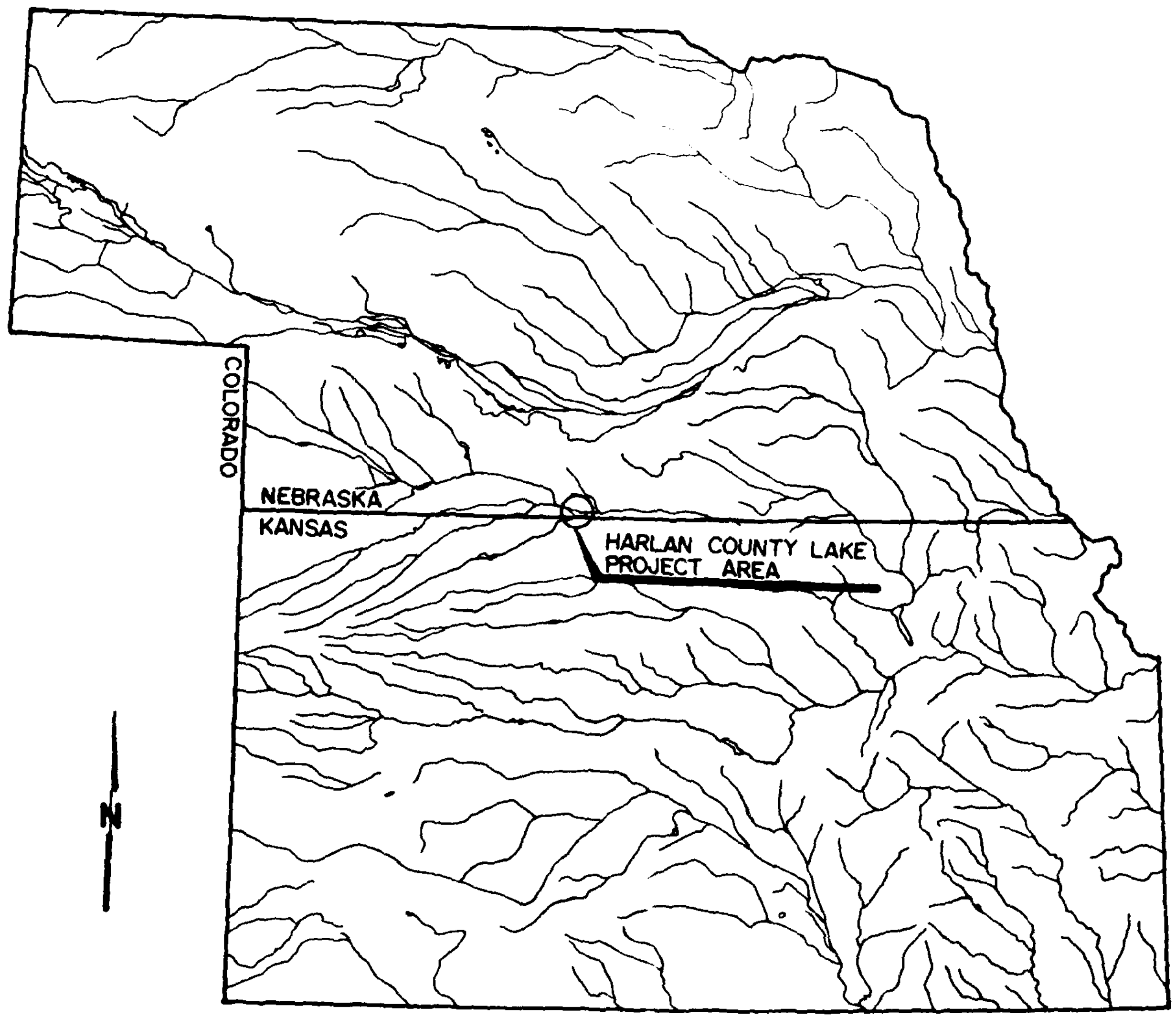


Figure 1. Location of the project area.

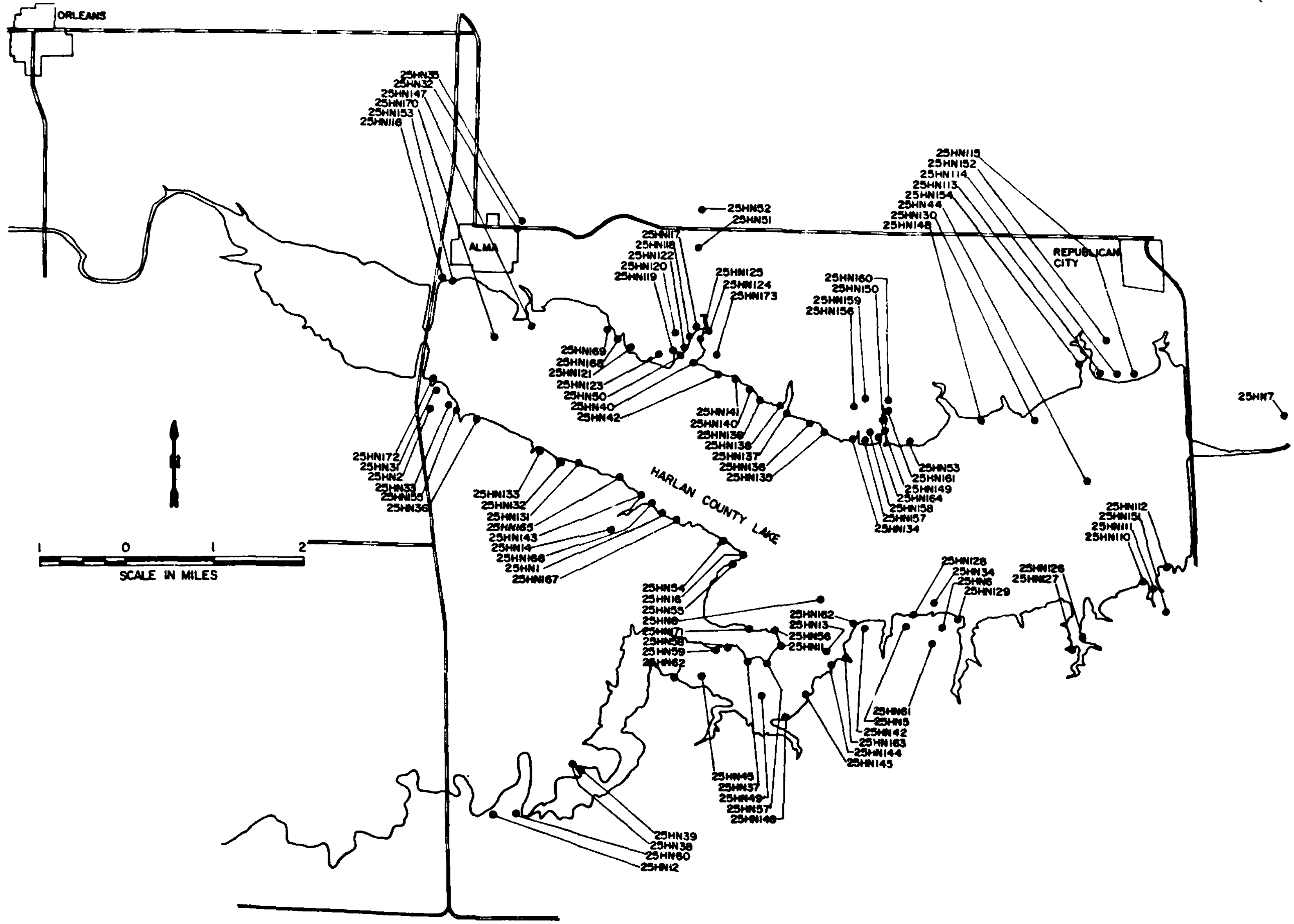


Figure 2. Location of all recorded sites in the project area.

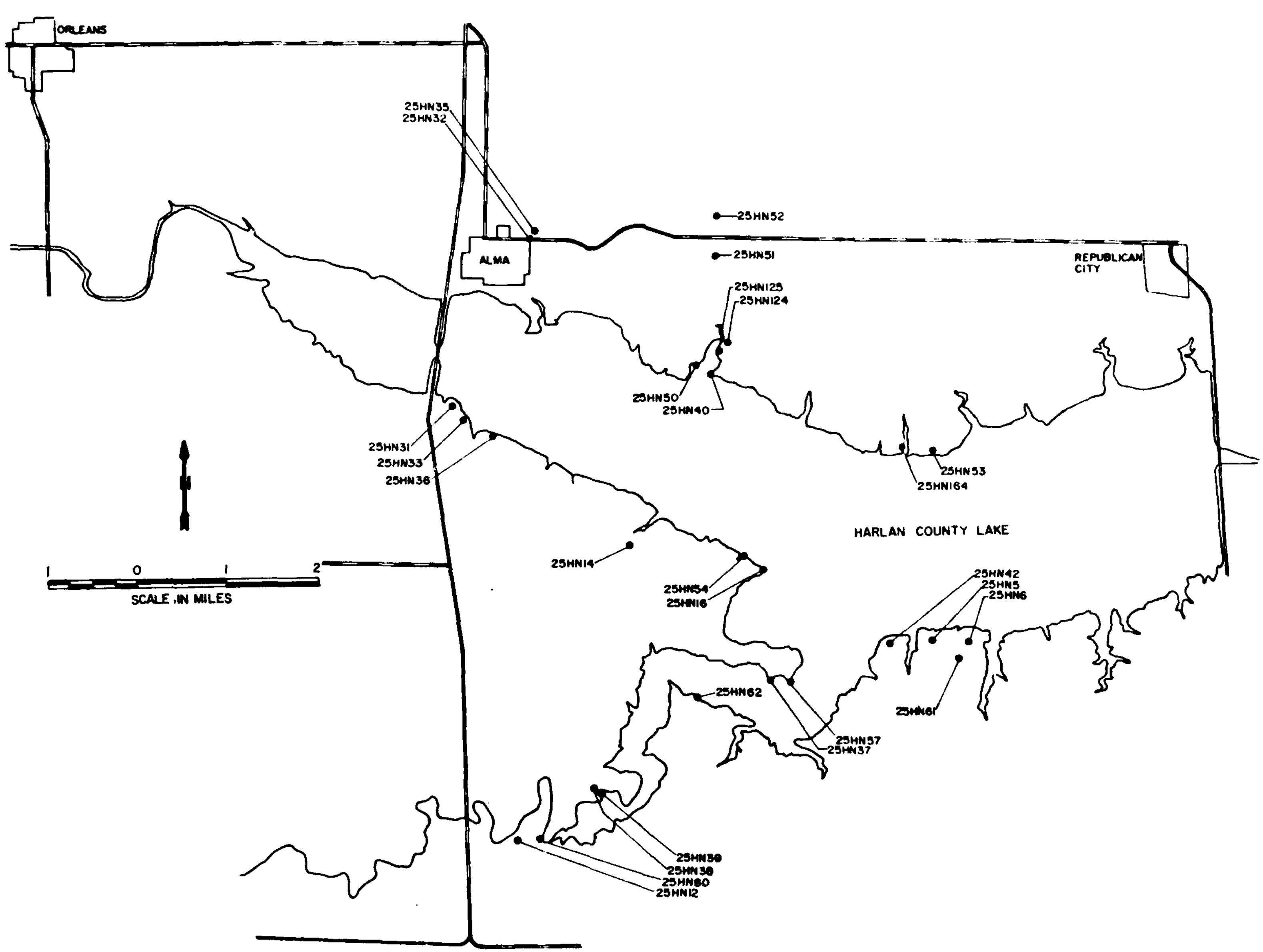


Figure 3. Location of sites tested during the present project.

an Upper Republican habitation; 25HN32, a Woodland period habitation; 25HN33, an Upper Republican occupation; 25HN35, a probable Woodland period manifestation; 25HN36, an Upper Republican village; White Cat Village (25HN37), a Dismal River Plains Apache village; 25HN38, a Woodland period habitation; Green Plum (25HN39), a White Rock complex camp site; 25HN40, a Woodland period Keith complex occupation; Indian Hill (25HN42), an Upper Republican habitation; 25HN50, a possible Woodland occupation and historic schoolhouse; 25HN51, an Upper Republican occupation; 25HN52, an Upper Republican site; 25HN53; 25HN54, an Upper Republican habitation; 25HN57, a multicomponent prehistoric and historic site; 25HN60, an Upper Republican occupation; 25HN61; 25HN62; 25HN124; 25HN125, a Keith complex occupation; North Cove (25HN164) a scientifically important paleontological site with cultural associations; and Buffalo Bill's Cave, a limestone overhang with a local historic legend.

In order to sufficiently address all issues involved with the investigations of 28 prehistoric and historic resources, this report presents a multidisciplinary approach by professional archaeologists, historian, geomorphologist, palynologist and vertebrate paleontologist. The complexity of the project becomes apparent with the introduction of the following chapters. The remainder of this chapter presents pertinent background information regarding the research goals of the project and the previous investigations in the lake area. Chapter 2 by Brad R. Logan describes the environmental setting of southcentral Nebraska as revealed by present day parameters. Chapter 3 by Kenneth L. Brown extends the discussion of environment and delineates climatic events prevelant in the project area for the past 10,000 years. Soils and geomorphic features influenced by the past and present environments are clearly defined in Chapter 4 by Kevin J. Cornwell. Human occupation was both a response and an adaptation to the changing local environment and Chapter 5 by Kenneth L. Brown, Marie E. Brown and Daniel C. Fitzgerald provides an overview of the culture history of the Republican River drainage. Field and laboratory methods employed to implement the research design are discussed by Mary J. Adair and Kenneth L. Brown in Chapter 6. The following chapter, Chapter 7 is divided into two parts: Part 1 by Mary J. Adair, Kenneth L. Brown, Marie E. Brown, Daniel C. Fitzgerald and Kevin J. Cornwell presents the results of investigations at the 28 sites investigated during this study; Part 2 by J. D. Stewart and Glen G. Fredlund is concerned entirely with the North Cove site (25HN164). In Chapter 8 by Kenneth L. Brown the stone tool technology and use wear patterns observable in the recovered lithics are presented. Chapter 9 by Brad R. Logan discusses the ceramics recovered from Woodland and Plains Village period sites. As with the previous chapter, observations were recorded on specific variables that identify raw material, method of manufacture, use or re-use of the artifact and characteristics that are diagnostic of particular cultures. Chapter 10 by Marie E. Brown, Mary J. Adair and Steven Bozarth discusses the prehistoric subsistence economies noted from sites that contained preserved botanical and faunal remains. These economies are compared with those known from sites in surrounding areas.

Chapter 11 by Mary J. Adair and Kenneth L. Brown summarizes the present work and integrates these findings into an overall summary of prehistoric cultural chronology and subsistence patterns and Late Pleistocene and Early Holocene environmental transitions, and discusses evaluations and recommendations for site significance based on data obtained during this project.

Research Goals

The scope-of-work for archaeological testing of the 28 sites delineated a series of research goals including a refinement of site size, type and cultural affiliation; chronological placement of sites based on absolute radiocarbon determinations and temporally diagnostic artifacts; prehistoric resource utilization; an examination of changes in settlement-subsistence patterns; geological investigations; and a reconstruction of paleoenvironments. These research goals were initially defined in the research design (Adair and Brown 1985). After the completion of the fieldwork phase, several of these goals were revised to more accurately reflect the actual data recovered from the 28 sites. The specific research goals addressed in this report include environmental reconstruction of paleoclimates and geomorphic events, refinement of culture history and chronology, investigations of settlement-subsistence patterns and a determination of National Register eligibility.

Culture History and Chronology

According to previous investigations, the cultural affiliation for several of the 28 sites had been identified. Components assigned to the Paleo-Indian, Archaic, Woodland, Plains Village and proto-historic periods were recognized. Diagnostic artifacts for each of these periods were well delineated and documented in the literature. Temporal and spatial limits of complexes assigned to these cultural periods were not, however, as clearly defined. Radiocarbon dates were available for only a few of the sites while the spatial limits of several of the complexes (especially the Keith Woodland complex) were relatively unknown.

Several of the sites investigated for this project offered the potential for refinement of the culture history and chronology of southcentral Nebraska in general and the Republican River Valley in particular. Of special interest are sites assigned to the Paleo-Indian, Woodland, Upper Republican and Dismal River cultural complexes. An early radiocarbon date of 14,810 B.P. (12,750 B.C.) and the presence of several unmodified flakes from the North Cove site (25HN164) suggested the possibility of an Early Man occupation in the Harlan County Lake area, possibly the earliest such site known for southcentral Nebraska. Most Woodland period sites in the project area had been assigned to the Keith variant although radiocarbon dates for this complex are extremely rare. Investigations at possible Keith complex sites focused on the recovery of sufficient charcoal for radiocarbon dating. Radiocarbon dates are also limited for the Upper Republican and Dismal River complex sites in the area, and therefore investigations associated with this project were designed for the recovery of remains suitable for absolute dating.

Reconstruction of Paleoclimates and Environments

Preliminary investigations at the North Cove (25HN164) site by J.D. Stewart in 1984-1985 suggested that this site could provide the most complete Late Pleistocene to Early Holocene paleoenvironmental record for the Central Plains. Deposits were known to contain macrobotanical and macrofossil remains while a radiocarbon date of 14,810 B.P. (12,750 B.C.) suggested great antiquity for these remains. While a reconstruction of paleoclimates and environments is, in itself, an important research goal, its value increases significantly when human presence and adaptation to these environments are included. Data from the North Cove suggested the potential for addressing both issues and possibly providing the most complete record of this time period yet known in the Central Great Plains.

Settlement and Subsistence Patterns

The manner in which a group feeds and organizes itself is often related to many other aspects of their culture. A reconstruction of settlement-subsistence therefore, is often critical in understanding past lifeways and in differentiating one adaptation from another. Often, however, these research goals require specific methods and techniques for the recovery of the data. Investigations proposed for this project focus heavily on these methods, which include water flotation, macrobotanical and macrofaunal identification, and an examination of resource zone exploitation patterns. Of particular interests are the role of agricultural crops in the diet of Woodland, Upper Republican, and Dismal River peoples, the varieties of animals hunted and the season(s) of the hunt, and the extent of occupation at the particular site.

Previous Investigations at Harlan County Lake

In researching the history of early work in the project area, it becomes readily apparent that investigations in the Republican River Valley in general and Harlan County in particular, paralleled initial professional work by archaeologists within the state of Nebraska. An excellent reference to these earliest investigations is found in Wedel (1986).

The excavation of sites and collection of artifacts in the project area may have started with the early arrival of Euro-American settlers. Homesteads were often placed on terraces above permanent water sources, often the location of prehistoric occupations and it is not unreasonable to speculate that these early settlers were intrigued by the stone tools, ceramics, storge facilities and burial mounds so visible in the area. The Nebraska State Historical Society, founded in 1883, provided an outlet for exchange of information as it helped direct the recognition and investigation of prehistoric occupations in the Republican River Valley. Very few sites were adequately addressed however, and as Wedel (1986:2) states, the museum collections that resulted from these early activities are so meager that they often tantalize rather than inform the modern day researcher.

These amateur activities continued throughout the early 1900's, with two notable exceptions. In 1902, E.E. Blackman was appointed archaeologist and museum curator of the Nebraska State Historical Society. Blackman was responsible for some early surveys of the Republican River Valley, including sections around the town of Orleans. His notes, though not very extensive, describe remains of large villages, scattered with jasper flakes with storage facilties and lodge remains clearly visible. A second important event was the involvement of A.T. Hill of Hastings, Nebraska. While not an archaeologist by profession, Hill nevertheless was extremely familiar with portions of Nebraska and Kansas and grew to be one of the noted authorities on the location of archaeological sites, particularly those identified as the Republican River Pawnee. In 1933 Hill was appointed as director of the

Nebraska State Historical Society, a position that gave him the ability to conduct a number of investigations and to work closely with projects sponsored by the Smithsonian Institution and the University of Nebraska.

Systematic research within the state and within the project area began in 1929 with the establishment of the Nebraska State Archaeological Survey. Under the direction of W.D. Strong, fieldwork in the Republican River Valley began the following year when sites 25HN1 and 25HN5 were investigated. Excavations in Harlan County and surrounding areas demonstrated the presence of prehistoric populations that were sedentary and who maintained a subsistence economy that included agricultural crops. Strong's investigations eventually led to a definition of the Upper Republican culture, a cultural designation fully discussed in Introduction to Nebraska Archaeology (Strong 1935). In 1931 A.T. Hill conducted investigations at 25HN2, also within present day Harlan County. Work on this burial site is also included in Strong (1935).

Archaeological research in the project area experienced a hiatus until 1946 when a survey of a portion of the Republican River Valley was authorized under the Inter-Agency Archeological and Paleontological program. The Smithsonian Institution River Basin Survey, under the direction of W. R. Wedel was engaged to perform an intensive survey of the proposed Harlan County Lake. Initial surveys were conducted in August 1946 by M.F. Kivett and J.M. Shippee. Their work focused on the Republican River Valley between Alma and Methodist Creek on the north side of the river, and from the mouth of Prairie Dog Creek west along the south bank of the river (Pepperl and Falk 1979). A total of 23 sites were recorded, including 16 habitations and seven burials. Limited testing was conducted at 10 of these sites (25HN3, 25HN9, 25HN10, 25HN31, 25HN32, 25HN33, 25HN38, 25HN39, 25HN40 and 25HN41) and major excavations were initiated at Woodruff Ossuary (14PH4), located outside of the lake boundaries. Material from this latter site, along with remains from 25HN3 and 25HN4, were used to define the Keith complex, a major Woodland period manifestation in the area.

For the next five years, 1948-1952, the University of Nebraska Archaeological fieldschool conducted several archaeological investigations in the project area. The primary focus of these efforts was the subsurface investigations of particular sites that had been recorded by the River Basin Survey (RBS) or identified by local informants (Pepperl and Falk 1979:10). A total of 22 sites were investigated in some fashion, including nine that had not been previously recorded. While work at several of the 22 sites consisted of only a surface collection, others were extensively tested or excavated. The latter category included White Cat Village (25HN37), which became the focus of attention for the entire five years. Major excavations were also conducted at sites 25HN9, 25HN11, 25HN34, 25HN36, 25HN39, 25HN44, 25HN45 and 25HN46. Limited testing was carried out at sites 25HN12, 25HN13, 25HN33 and 25HN42.

Following the inundation of the area in 1952, all fieldwork was terminated, a situation that remained unchanged for the next 20 years. During this time however, several major analyses were completed, resulting in important publications. Cultural remains, house structures and features from 25HN37 are described by Gunnerson (1960, 1968) and provides a basis for the Dismal River Apache cultural taxonomic destinction. The Woodruff Ossuary (14PH4) is described by Kivett (1951, 1953) as a major Keith complex Woodland burial practice. Analysis of materials from sites 25HN39 and 25HN45 were used to identify the Blue Stone focus of the White Rock aspect (Cummings 1953). Further analysis and description of the work conducted at these two sites is provided by Rusco (1960). In this study, a comparison is made between the remains from Harlan County and those from the Glen Elder Lake in Kansas in an attempt to identify the nature of occupation in the two locations. Also comparing material culture remains from the two lake areas is Roll's (1968) statistical analysis of Upper Republican ceramics.

In 1972, field investigations in the Harlan County Lake area resumed with the development of a Master Plan for the recognition and conservation of archaeological sites. Work conducted by the the National Park Service, Midwest Archeological Center included an inspection of all known archaeological sites within the project area, a clarification of indefinite site locations and an assessment of the present and probable future status of these sites (Falk and Theissen 1972:2). Surface collections were made at sites 25HN2, 25HN16, 25HN36, 25HN37, 25HN38 and 25HN42.

In 1977 the U.S. Army Corps of Engineers concluded yet another formal agreement for archaeological work in the Harlan County Lake area. In its agreement to develop a management plan for all cultural resources located within the lake area, the Department of Anthropology, Division of Archeological Research, University of Nebraska followed a five point program. This included: (1) records search and evaluation; (2) literature search of relevant information; (3) National Register Consultation; (4) reconnaissance and limited survey investigation; and (5) development of management plan and preparation of final report (Pepperl and Falk 1979). Fieldwork consisted of revisiting 50 sites in the lake area, recording site size and noting distribution and density of artifacts. No collections were made (Pepperl and Falk 1978).

The last professional investigation in the lake area prior to this project was conducted in 1979-1980 by Impact Services, Inc. of Mankato, Minnesota. Objectives of this work were to inventory archaeological resources on the periphery of the lake, to intensively test a number of known sites to determine their eligibility for nomination to the National Register of Historic Places and to make recommendations to the Corps regarding future management of the cultural resources in the project area (Roetzel et al. 1982:ii). A total of 64 new sites were identified and recorded, seven previously recorded sites were tested for National Register significance and the project recommended that the area be nominated as a NRHP district.

Summary

Professional archaeological research in the Harlan County Lake area spans a considerable amount of time. It began with the emergence of archaeological work in the Central Plains and benefited from the direction of several prominent Plains archaeologists. Although concerned with issues of culture history and placement of complexes into taxonomic nomanclatures, people like A.T. Hill, William Duncan Strong, Marvin F. Kivett, J. Mett Shippe, Donald Lehmer, James H. Gunnerson and Waldo R. Wedel laid the foundation for all subsequent research in the project area. Most of the research has been connected with federal legislation and with the construction of the lake. In the early days of salvage archaeology, inadequate funds, personnel and time prevented much of the data from being analyzed (Jennings 1985). Pepperl and Falk (1979:12) state that today the cultural remains from only one-third of the sites recorded in the lake area have received adequate laboratory analysis.

There is still much to be learned about the prehistoric peoples who once occupied the sites investigated by this project. Some information may never be recovered or reconstructed, due to destruction caused by repeated actions of erosion, inundation, vandalism and to previous excavations. This report focuses on three main research goals that will hopefully answer or address some of the unanswered questions.

Chapter 2

The Present Environmental Context

Brad R. Logan

Introduction

The environment of the Harlan County Lake area provided more than a passive background against which the cultural dynamics of past human inhabitants can be viewed. The physical settings of human history must be considered an integral part of cultural systems that have influenced, to some degree, the many forms of cultural adaptation. Changes in those settings may be seen, in some cases, to correlate with changes in cultural adaptation. This view of the process of cultural change as adaptive response to environmental change is not to be taken as advocacy of environmental determinism, the idea that environment both shapes human morphology and dictates human behavior. Such a concept has been rejected by anthropologists concerned with human ecology (e.g., Steward 1938, 1955; Wedel 1947; Clark 1972; Bennett 1976; Hardesty 1977; Kirch 1980; Boas 1888).

The view most widely shared today is that the social and physical environment defines the range of behaviors that a population may adopt or invent, practice and transmit, and that some environments are more or less permissive than others. Humans are not so constrained by their surroundings that they lack the ability to choose from a variety of alternative behaviors. A society is not stringently subject to the vagaries of its circumstances. It can succeed or fail to adapt as a consequence of factors that often lie within the cultural system. Changes in the adaptation of the prehistoric and historic inhabitants of the Harlan County Lake area are considered to be examples of the integrated, but non-deterministic, relationship between humans and their physical surroundings (Wedel 1986). With this in mind, the environmental context of the study area for the Holocene period is briefly described. For data on the Late Pleistocene environment of the study area refer to Chapters 3 and 7.2.

Physiography

Harlan County Lake is located on the Republican River in the High Plains section of the Great Plains Physiographic Province. This Section is noted for the extreme flatness of interstream areas, the "remnants of a single great expanse of fluviatile plain or alluvial slope", which is known to have extended from the Rocky Mountains on the west to the Central Lowlands on the east (Fenneman 1931:5). The eastern margin of this Section is being dissected in a westward direction by such streams as the Republican River.

Structural Geology

Most of the surface topography of the Harlan County Lake area is formed from extensive deposits of light-gray and pale brown loess, wind deposited silts of post-Kansas age that cover the broad uplands and higher stream terraces. Underlying the loessial deposits is sandstone of Tertiary age. Bedrock units of the Niobrara and Pierre Formations primarily outcrop south of the Republican River and on slopes associated with drainages. The underlying Niobrara Formation consists of chalky shale that contains thin beds of limestone. The overlying Pierre Formation consists of dark colored shale, numerous light colored bentonite clay layers up to six inches thick, and irregular calcite seams. Pierre and Niobrara Formations are Cretaceous in age.

Hydrology

Harlan County is drained and dissected by the Republican River and its principal tributaries, Sappa Creek and Prairie Dog Creek. These streams are eastward flowing. They receive water from numerous smaller, intermittant tributaries that generally flow in a north-south direction. These streams have created a parallel series of narrow interfluves generally less than one mile wide. In the northern and northeastern sections of the county, the loessial plain is more poorly drained and surplus water collects there in potholes (Mitchell et al. 1974:62-63).

Prior to construction of the Harlan County Lake dam, the Republican River valley was subject to floods of a sometimes catastrophic nature. Major historic floods occurred in 1903, 1915, 1923 and 1935. The flood of 1935 is considered the greatest on record for the Republican River. It was the result of an average of nine inches of precipitation that occurred over an area of 1,000 square miles of the upper basin in late May and early June of that year. At Cambridge, Nebraska, upstream from the study area, the river crested at 380,000 cubic feet per second. At Hardy, Nebraska, downstream from the study area, the river crested at 225,000 cubic feet per second. The flood resulted in the deaths of 110 people throughout the watershed. Smaller scale floods have occurred in tributary valleys, such as that along Sappa Creek in 1944 (Wedel 1986:35-36). It may be assumed that the prehistoric inhabitants of the study area considered the frequency and effects of such events when they selected their habitation sites in the study area. Not surprisingly, most prehistoric habitation sites occur on elevated ground, such as terraces, less prone to inundation than floodplains.

Climate

Harlan County, Nebraska is located near the center of the United States. Consequently, its prevailing climate is continental and is characterized by warm summers, cold winters, and highly variable precipitation on a daily, seasonal and annual basis. The area is subject to colder winds from the north, warm and moist air from the Gulf of Mexico, and hot and dry winds from the west. Nearly 80 percent of the annual precipitation (22.3 inches; Fig. 4) in the county occurs from April through September and is attributable to the then prevailing winds from the south. Precipitation can vary widely not only throughout the year, but from place to place in the region. Isolated spring and summer thunderstorms, which account for this variation, may be locally heavy and of short duration. The fall months are characterized by a climate of cool nights, light rainfall, and abundant sunshine. The winter months, when winds are from the north, are generally cold and dry. The light winter precipitation generally occurs in the form of snow, which seldom remains on the ground for long. An average winter will have 39 days of snow-covered ground (Myers 1974).

As Wedel (1986:33-35) has more adequately expressed, averages of precipitation are often misleading in regard to the Central Plains region in general and to the Republican River basin in particular. If any word characterizes the rainfall pattern of this area it must be "variable". The wide ranging variations in precipitation throughout the Central Plains on both short-time and long-time levels have had dramatic effects on human populations dependent on maize agriculture or horticulture. Wedel (1953, 1986) best demonstrates this by showing the east-west movement of the 20-inch isohyet during the extremely wet (1915), moderate and extremely dry (1936) years (Fig. 5). Since the annual average precipitation in Harlan County is barely above the minimum required for risk-free maize growing (20 inches), it is clear that any populations, prehistoric or historic, dependent on such a crop would be greatly affected by any decrease in this average. Utilizing palynological and dendrochronological evidence, Wedel (1986:39-48) notes that the climatic trend in the Great Plains since A.D. 1700 has been one of alternating dry and wet periods with the former peaking every 20-25 years.

Temperatures in Harlan County during the period of historic record have ranged from an extreme of 116 degrees Fahrenheit in 1934 to an extreme low of minus 38 degrees Fahrenheit in 1899. Data on average daily maxima and minima for each month are presented in Figure 6. The probabilities of first and final freezes in the fall and spring, respectively, are presented in Table 1 (Myers 1974).

Vegetation

The indigenous vegetation of the Harlan County Lake area would have been characterized by broad areas of medium-tall grass prairie with woodlands limited to narrow, galleries along major streams. Kuchler (1964:69; Fig. 7) characterizes the physiognomy of the region that includes the study area as a "dense, medium tall grassland with many forbs". Dominants in this community are little bluestem (Andropogon scoparius), side-oats grama (Boutelous curtipendula), and blue grama (Bouteloua gracilis). Indigenous food plants in the area would have included the prairie turnip (Psoralea esculenta), Indian potato (Apios americana), Jerusalem artichoke (Helianthus tuberosus), bush morning glory (Ipomoea leptophylla), cattail (Typha ssp.), and arrowhead (Sagittaria latifolia) (Wedel 1986:17-18). At least two indigenous plants, the sunflower (Helianthus annuus) and the marshelder (Iva annua) were cultivated along with maize, beans and pumpkins by the prehistoric inhabitants of the Central Plains (Adair 1984; Wedel 1986:18).

Indigenous trees that formed the gallery woodlands were a westward extension of the oak-hickory forests that dominated the tallgrass prairie-hardwood forest ecotone to the east (Kuchler 1964, 1974; Wedel 1986). General Land Office Survey records (ca. 1859, 1965) indicate a variety of trees along the Republican River and its major tributaries. These were predominantly broad-leaved forms, including elm (Ulmus americana), burr oak (Quercus macrocarpa), white ash (Fraxina americana), box elder (Acer negundo), hackberry (Celtis occidentalis), honey locust (Gleditsia triancanthos), black locust (Robinia pseudoacacia), catalpa (Catalpa speciosa), cottonwood (Populus deltoides), and black willow (Salix nigra). Although nut trees would have been uncommon in the study area, the black walnut (Juglans nigra) is known to have grown as far west as Harlan County (Wedel 1986:21).

Fauna

Wedel (1986:22-25) provides a fairly comprehensive list of the animals that were indigenous to the Republican River basin during Holocene time and that are, therefore, applicable to the study area. Chief in importance to the prehistoric and historic Indian inhabitants of the area was the bison (Bison bison), source of not only food but a variety of other items, such as hides for shelter and bones for tools. Other mammals included the pronghorn (Antilocapra americana), wapiti (Cervus canadensis), mule deer (Odocoileus hemionus), plains grizzly (Ursus horribilis), black bear (Ursus americanus), cougar (Felis concolor),

Table 1

Probabilities of last freezing temperatures in spring and first in fall

Probability	Dates for given probability and temperature degrees F. 16.	20.	24.	28.	32.
Spring					
1 year in 10 later than	4/7	4/14	4/23	5/7	5/17
2 years in 10 later than	4/1	4/9	4/17	5/1	5/12
5 years in 10 later than	3/22	3/30	4/7	4/21	5/2
Fall					
1 year in 10 earlier than	10/28	10/21	10/15	10/4	9/23
2 years in 10 earlier than	11/2	10/26	10/20	10/9	9/28
5 years in 10 earlier than	11/13	11/5	10/30	10/19	10/7

adapted from Mitchell et al. 1974

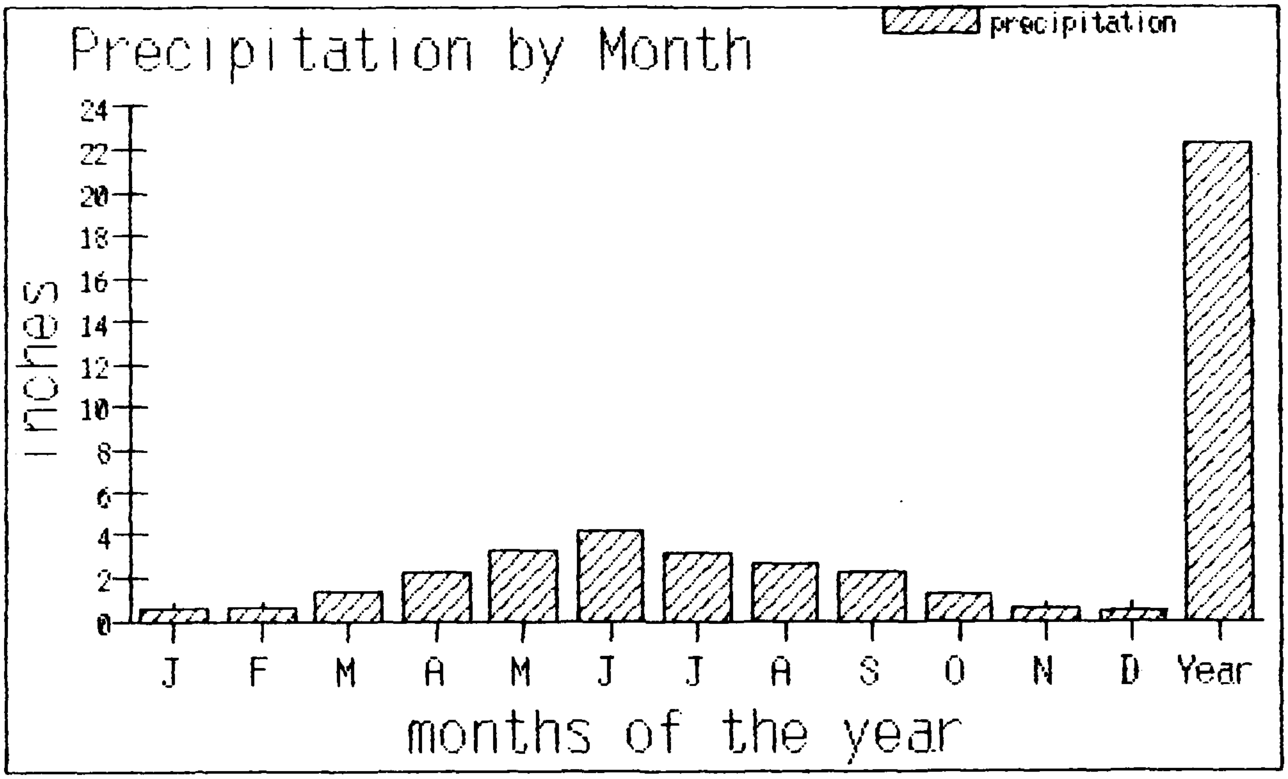


Figure 4. Precipitation patterns for Harlan County, Nebraska. (from Mitchell et al. 1974).

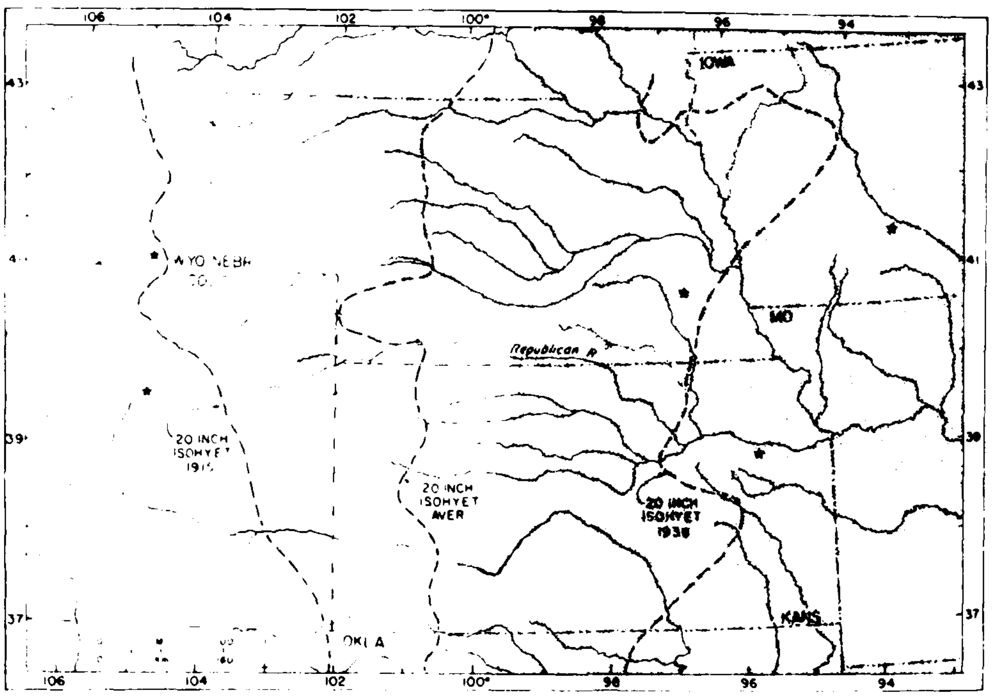


Figure 5. Map of the central plains showing fluctuations in regional rainfall averages and generalized native vegetation areas. Broken lines indicate 20-inch (500 mm) annual precipitation in wet (1915), average, and dry (1936) years. Stippled, tall-grass prairies; unstippled, short-grass steppe. (from Wedel 1976).

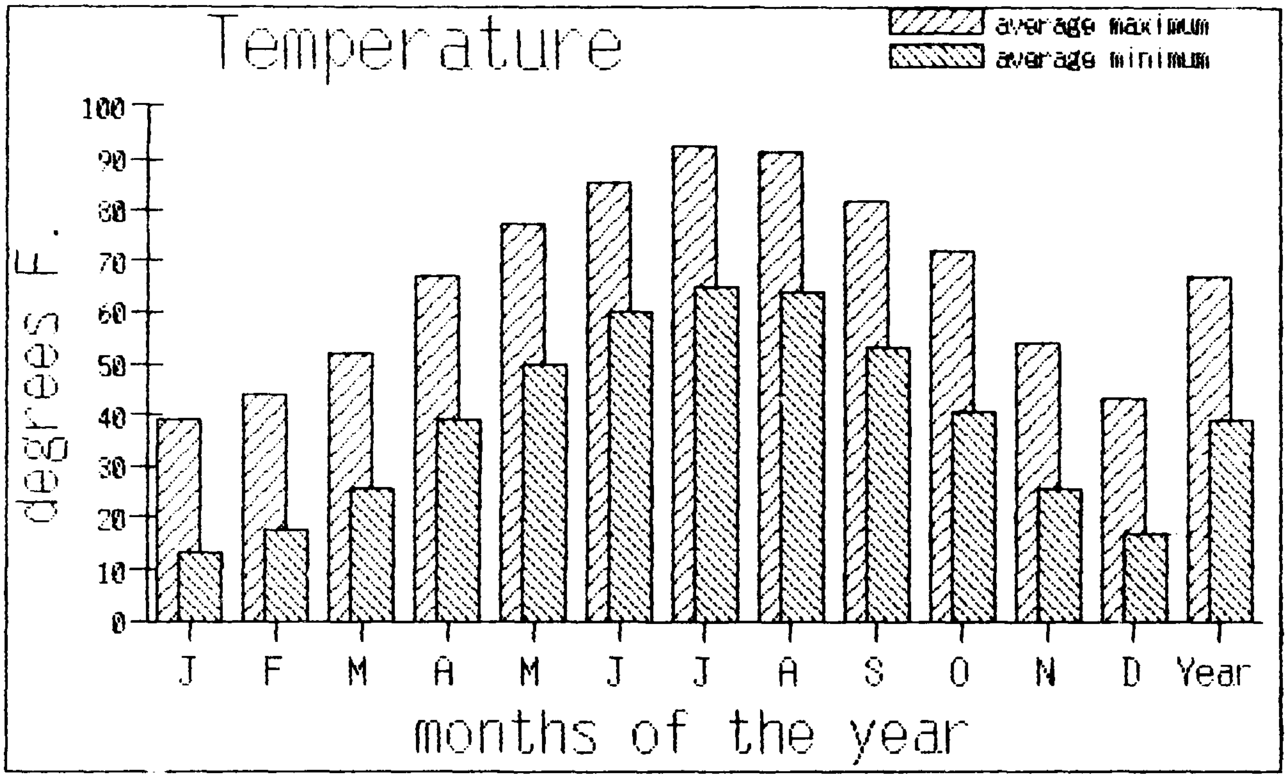


Figure 6. Temperature maximum and minimum for each month, Harlan County, Nebraska. (from Mitchell et al. 1974).

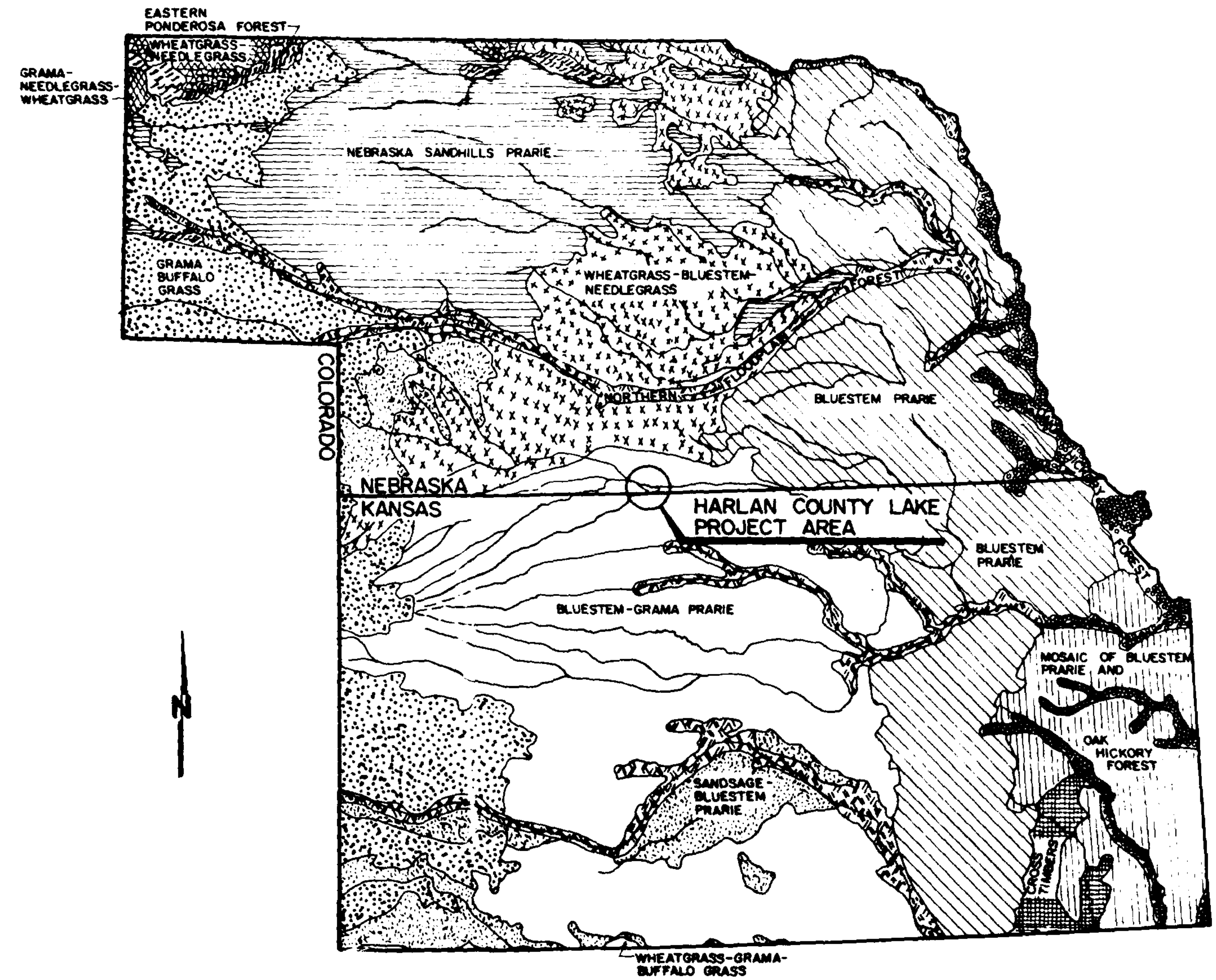


Figure 7. Vegetation Zones.

bobcat (Lynx rufus), wolf (Canis lupus), badger (Taxidea taxus), beaver (Castor canadensis), river otter (Lutra canadensis), raccoon (Procyon lotor), mink (Mustela vison), muskrat (Ondatra zibethicus), prairie dog (Cynomys ludovicianus) and black-footed ferret (Mustela nigripes).

Bird species would have been, as they now are, abundant. Notable in this context are such known game birds as the turkey (Meleagris gallopavo), sharp-tailed grouse (Pedioecetes phasianillus), greater prairie chicken (Tympanuchus cupido), Canada goose (Branta canadensis), mallard (Anas platyrhynchos), northern pintail (Anas acuta), northern shoveler (Spatula clypeata) and blue-winged teal (Anas discors).

Fish, amphibians and reptiles do not seem to have figured significantly in the diet of the prehistoric and historic Indians of the Central Plains. Remains of such fish as catfish and suckers have been recovered at archaeological sites, as have those of shellfish. Skeletal remains of the rattlesnake (Crotalus viridus), bullsnake (Pituophis melanoleucus), hognose snake (Heterodon nasicus), garter snake (Thamnophis sirtalus), and blue racer (Coluber constrictor) have also been encountered at sites in the Republican River basin. Finally, the carapace of the box turtle (Terrapene ornata) was also utilized for cups, containers, or rattles (Wedel 1986:25).

Chapter 3

Prehistoric Environments

Kenneth L. Brown

Introduction

The reconstruction of past environments in a region is complex. One source used by archaeologists is the paleoenvironmental record preserved at sites. This is a reliable method since floral and faunal remains are usually directly related to the prehistoric environment. This method, however, is dependent upon the recovery of sensitive environmental indicators such as pollen and gastropods. Fortunately, gastropods, pollen and environmentally sensitive fauna and flora remains were recovered from the North Cove site (25HN164), a Late Pleistocene occurrence. Unfortunately, no environmentally sensitive data was recovered that corresponds to the period from approximately 10,000 B.C. to A.D. 500. Recovery of macro-faunal and macro-botanical remains from prehistoric Indian sites dating more recent than A.D. 500 indicate a modern environment. Consequently, other sources of information must be used to postulate prehistoric environments in the Harlan County Lake area.

It has been postulated that major environmental events occurred at approximately 7190 B.C., 6500 B.C., 4030 B.C., 2730 B.C., 940 B.C., A.D. 260, A.D. 1190, A.D. 1550 and A.D. 1850 (Table 2) (Bryson, Baerrais, and Wendland 1970:63). The dates of significant environmental change were derived by analysis of radiocarbon dates in ten volumes of *Radiocarbon* (1959-1968). Selecting only those dates thought to be significant by the person who wrote the sample description, and which also indicated geologic discontinuities, the number of radiocarbon dates to be analyzed was reduced to 620. The frequency with which the 620 radiocarbon dates fell within each two centuries of the last 10,000 years was counted and subjected to a least-square computer fit of the normal distribution to actual radiocarbon dates. Results showed the radiocarbon dates tended to cluster into the nine major times of discontinuity listed above (Bryson, Baerris and Wendland 1970:53-54).

Analysis of the radiocarbon dates was used to construct a postulated "step-like" succession of post-glacial climatic episodes. This climatic model replaced the simpler model of Ernst Antevs that postulated a gradual rise in post-glacial temperatures followed by a gradual fall in temperatures (Antevs 1955). The climatic model is based partially upon the Blytt-Sernander system widely used in Europe.

Table 2

Past Climatic Episodes Postulated by Various Authors

Beginning Dates for Post Glacial Climatic Episodes

Climatic Episode		Baerries Bryson 1965	Bryson Wendland 1967	Bryson Baerreis Wendland 1970	Wendland Bryson 1974
Recent		A.D. 1880	A.D. 1850		
Neo-Boreal		A.D. 1550	A.D. 1550		
Pacific	II	A.D. 1450	A.D. 1450		
	I	A.D. 1250	A.D. 1200	A.D. 1190	A.D. 1100
Neo-Atlantic		A.D. 800-900	A.D. 900		
Scandic		A.D. 300-400	A.D. 400	A.D. 260	A.D. 270
Sub-Atlantic		500-600 B.C.	550 B.C.	940 B.C.	810 B.C.
Sub-Boreal	III				1620 B.C.
	II				2290 B.C.
	I			2730 B.C.	3110 B.C.
Atlantic	IV			4030 B.C.	4100 B.C.
	III			5100 B.C.	4960 B.C.
	II			5780 B.C.	5790 B.C.
	I			6500 B.C.	6540 B.C.
Boreal	II			7190 B.C.	
	I			7700 B.C.	7350 B.C.
Pre-Boreal				ca. 8550 B.C.	8080 B.C.

Before describing postulated climatic conditions for the defined climatic episodes, a few terms and concepts need to be explained. The current climate in the Plains is determined by three major air masses: (1) the Maritime Tropical that originates in the American tropics and the Gulf of Mexico; (2) the Mild Pacific that originates in the Pacific Ocean; and (3) the cold Arctic that originates at the Arctic Circle. It is the interaction of these three air masses that determine temperatures and precipitation of regions within the Plains (Bryson and Wendland 1967:274).

The warm Maritime Tropical air carries with it a large quantity of moisture. The cold Arctic air carries little moisture, but when it comes into contact with the warm, moist, Tropical air, precipitation occurs at the juncture of these two oppossing air masses. The Mild Pacific air mass can be explained in terms of western topographic features. The western mountains are generally too high to allow the moist, warm Pacific air to cross them. Instead, there are three dominant routes by which the Pacific air crosses the mountains. The southern route is through what is approximately the border of the United States and Mexico. This route carries the greatest flow of Pacific air during the winter when the westerlies are far south. This air crosses southern California and Arizona into the southern Plains, known as the Llano Estacado. This air is seasonally warm and very dry as it descends down the east slope of the mountains (Bryson 1980).

The central air route follows the Columbia River Valley along the border between Oregon and Washington, the Snake River in southern Idaho, and through the basins in Wyoming. This air is mild and dry and drives a wedge between the Arctic and Tropical air masses as it enters the northern and central Plains. This dry air coincides with the most easterly extension of the grasslands into Ohio and Pennsylvania. The northern Pacific air route has no broad passes through the Canadian mountains through which to pass. Rather, a vertical movement of the air occurs over the mountains. This air is mild and dry (Bryson 1980). The broad Mississippi Valley system allows unimpeded flow for the Arctic and Tropical air masses. The Pacific air drives a wedge, composed of the three varieties of westerlies, between the Arctic and Tropical air masses. The seasonal dominance and interaction of these five air-flows determines the distribution of plants and animals within the Plains and is the determinant of climatic change (Bryson 1980).

The following are brief descriptions of what the climates and environments may have been like during the past 14,000 years in southcentral Nebraska. Past climates cannot be described in detail; however, using modern mean patterns of airstreams and frontal boundaries to the modern distribution of biota, generalized reconstructions of past climatic patterns can be made. Information for the Late Glacial environment is partially derived from data recovered from the North Cove site (25HN164) that is located on the north shore of Harlan County Lake.

Late Glacial Pattern (12,000 B.C. - 8,000 B.C.)

The eastern half of North Dakota was covered by the Laurentide ice sheet of the Wisconsin glaciation at 14,000 B.C. The ice sheet was retreating by 10,000 B.C. to 8,500 B.C. in North Dakota. At this time the boreal forest biota became dominant. The boreal forest extended south into most of Nebraska (Bryson and Wendland 1967:281). The southern edge of the Arctic air mass in winter was tangent to the eastern face of the Rocky Mountains, ran south of the Sand Hills of Nebraska and just north of the Dismal Swamp in Virginia. The northern edge of tropical air in summer would have been tangent to the mountains of eastern Mexico, north to southewestern Kansas and then east through central Pennsylvania. The summer position of the Arctic air mass was probably along the frontal edge of the glacier. The Pacific air mass and westerlies should have been strong in the summer. Arctic air should have brought less cloud cover and very low relative humidity. Within the boreal forest, on well-drained sites and south facing slopes, spruce would have been replaced by plants better adapted to drought (Bryson, Baerreis and Wendland 1970).

Summers were probably cooler and winters warmer and less severe than present. Grasslands were probably expanding. Mean temperatures were probably a few degrees Celsius cooler than at present (Wedel 1986:43).

Investigations at the North Cove site (25HN164) indicate the presence of a Late Wisconsinan biota. Overlying Woodfordian units produced a larger sample of essentially the same fauna. Macrofossils of white spruce indicate climax conifers were widespread in the Great Plains. In addition to the Wisconsinan biota, the absence of reptiles (with the exception of a few snake vertebrae) indicate a cooler climate (see Chapter 7.2).

Pre-Boreal and Boreal Pattern (8,100 B.C. - 6,500 B.C.)

Pollen diagrams indicate an abrupt transition from Late Glacial to post-glacial pollen assemblages, indicating an abrupt change in the circulation patterns of the major air masses. The collapse of the Late Pleistocene boreal forest biota occurred about 8,500 B.C. and was replaced by grassland in the central and northern Plains. This rapid change from boreal forest to grassland could not have been without significant impact on the human populations in the region. Some Arctic air must have flowed south during the winter, but strong summer westerlies must have prevailed across North America in the mid-latitudes, extending the drier grassland environment eastward. The grassland biota existed in close proximity to the glacial ice front (Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974). The climate was increasingly continental in form with warmer summers and colder winters (Wedel 1986:43).

Investigations at the Lime Creek (25FT41) and Red Smoke (25FT42) sites in southwest Nebraska contain Plainview, Scottsbluff and Milnesand projectile points associated with Bison antiquus (Davis 1953, 1962). Occupations at the sites correlate with the Two-Creekan interval within the late Wisconsin glacial period (Davis 1953). Investigations at the Hudson-Meng site (Agenbroad 1978, 1983), located in northwestern Nebraska, yielded remains of a large bison butchering area associated with the Alberta cultural complex.

Atlantic Pattern (6,500 B.C. - 3,100 B.C.)

Rapid wasting of the glacier ice occurred after 6,000 B.C. The Pacific air that characterizes the grassland climate expanded northeastward into central Minnesota and towards the Atlantic Ocean (Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974). It is postulated that, during the Atlantic Climatic episode, the central and northern Plains were subjected to drought conditions that had a direct impact on the indigenous human and animal populations. The grasslands probably became dominated by short grasses. Wedel (1964) postulates a virtual abandonment of the short grass Plains by human populations, while Reeves (1973) and Frison (1975) suggest the Plains did support viable human populations. Reeves (1973) believes that a focal bison hunting economy prevailed, while Frison postulates a reduction in the human population and adaptation to a more diffuse economy.

Sub-Boreal Pattern (3,100 B.C. - 800 B.C.)

During the Sub-Boreal there was probably a stronger flow of Arctic air into central Canada that displaced the climate and biota southward (Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974). The pollen in western Nebraska indicates desiccation and an increase in grass pollen (Wedel 1986:43). In the Republican River basin the known occurrence of sites dating between 3,100 to 800 B.C. is generally lacking (Wedel 1986:72). Sites dating to this period, however, have been found in adjacent regions (e.g., Coffey site, 14PO1, Schmits 1978). It is expected that there was human habitation of the region at this time.

Sub-Atlantic Pattern (800 B.C. - A.D. 270)

The winters during the Sub-Atlantic episode would have been stormier and wetter, in addition to wetter and cooler summers (Baerreis and Bryson 1965; Bryson and Wendland 1967; Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974; Wedel 1986:43). In the Republican River basin the known occurrence of sites dating between 800 B.C. to A.D. 270 is generally lacking (Wedel 1986:72). Although there are few sites it is expected that there was human habitation of the region at this time.

Neo-Atlantic Pattern (A.D. 270 - A.D. 1190)

Conditions similar to the Atlantic episode started about A.D. 350 to 400. Summer rains extended farther into the southwest and maize farming became practical across most of the Great Plains. This indicates westerlies were weaker. It is during this time that Plains Woodland and Plains Village cultures arise with greater emphasis upon cultigens during the latter part of the Neo-Atlantic period (Baerreis and Bryson 1965; Bryson and Wendland 1967; Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974). Investigations during 1985 at Harlan County Lake yielded substantial evidence of human occupation during this period. Sites 25HN12, 25HN40 and 25HN125 contain remains associated with the Plains Woodland Keith complex and sites 25HN5, 25HN12, 25HN31, 25HN36, 25HN40, 25HN42, 25HN51, 25HN52, 25HN54 and 25HN60 contain remains associated with the Plains Village Upper Republican complex. Although no evidence of cultigens was obtained from investigations at these sites, investigations at other sites with similar cultural affiliation have yielded evidence of agriculture.

Pacific Pattern (A.D. 1190 - A.D. 1550)

The westerlies increased at about A.D. 1200. The prairie peninsula extended eastward across Illinois and Indiana. There was reduced Tropical air flow into the northern Plains, lowering temperatures and reducing summer precipitation. Antelope increased in importance, in relation to bison, in the diet of hunters of the High Plains. It is postulated that some of the drought stricken Upper Republican complex and Nebraska complex farming peoples in Nebraska moved northward into South Dakota along the Missouri River. Farming in marginal areas of the western portions of the Plains became impossible (Baerreis and Bryson 1965; Bryson and Wendland 1967; Bryson, Baerreis and Wendland 1970; Wendland and Bryson 1974; Wedel 1986:43).

Early investigations during the late 1940's and early 1950's at site 25HN36, located in the Harlan County Lake project domain, yielded evidence of a prolonged period of drought following abandonment of the site. A thick, culturally sterile, loess deposit measuring more than one meter thick overlaid the Upper Republican occupation at the site. The occurrence of antelope and rabbit as a major source of meat for the inhabitants at the site (see Chapters 7.1 and 10) suggest a more drier climate.

Neo-Boreal Pattern (A.D. 1550 - A.D. 1850)

Summers were cool and autumns were cold. Glaciers formed as far south as New Mexico in the Rocky Mountains. There was a general cooling of the climate (Baerreis and Bryson 1965; Bryson and Wendland 1967). It is at this time that the Dismal River complex (Plains Apache)(site 256HN37), White Rock complex (site 25HN39), historic Pawnee and intrusive tribes (e.g., Dakota, Cheyenne, Kiowa) occasionally entered southcentral Nebraska.

Recent Pattern (A.D. 1850 - Present)

During the past 135 years the climate in the Plains has been characterized by the return of strong westerlies (Baerreis and Bryson 1965; Bryson and Wendland 1967). There has been less precipitation, with the 51 cm (20 inch) annual precipitation cline shifting from eastern Colorado and Wyoming to central Kansas and Nebraska by 1936 (Wedel 1961:84)(see Fig. 5).

Summary

The preceding interpretations are an attempt to demonstrate a correlation between past climatic patterns and biota. The literature on past climates and biotic response to climatic change is voluminous and is only highlighted above. The Harlan County Lake area provided the indigenous human inhabitants with a variety of plant and animal foods. Many of the food resources were available seasonally. The region, located in the short grass plains, has undergone several major post-glacial climatic episodes that altered the local flora and fauna resources. These past events undoubtedly influenced the peoples utilizing these resources.

Chapter 4

Geomorphology and Soils

Kevin J. Cornwell

Introduction

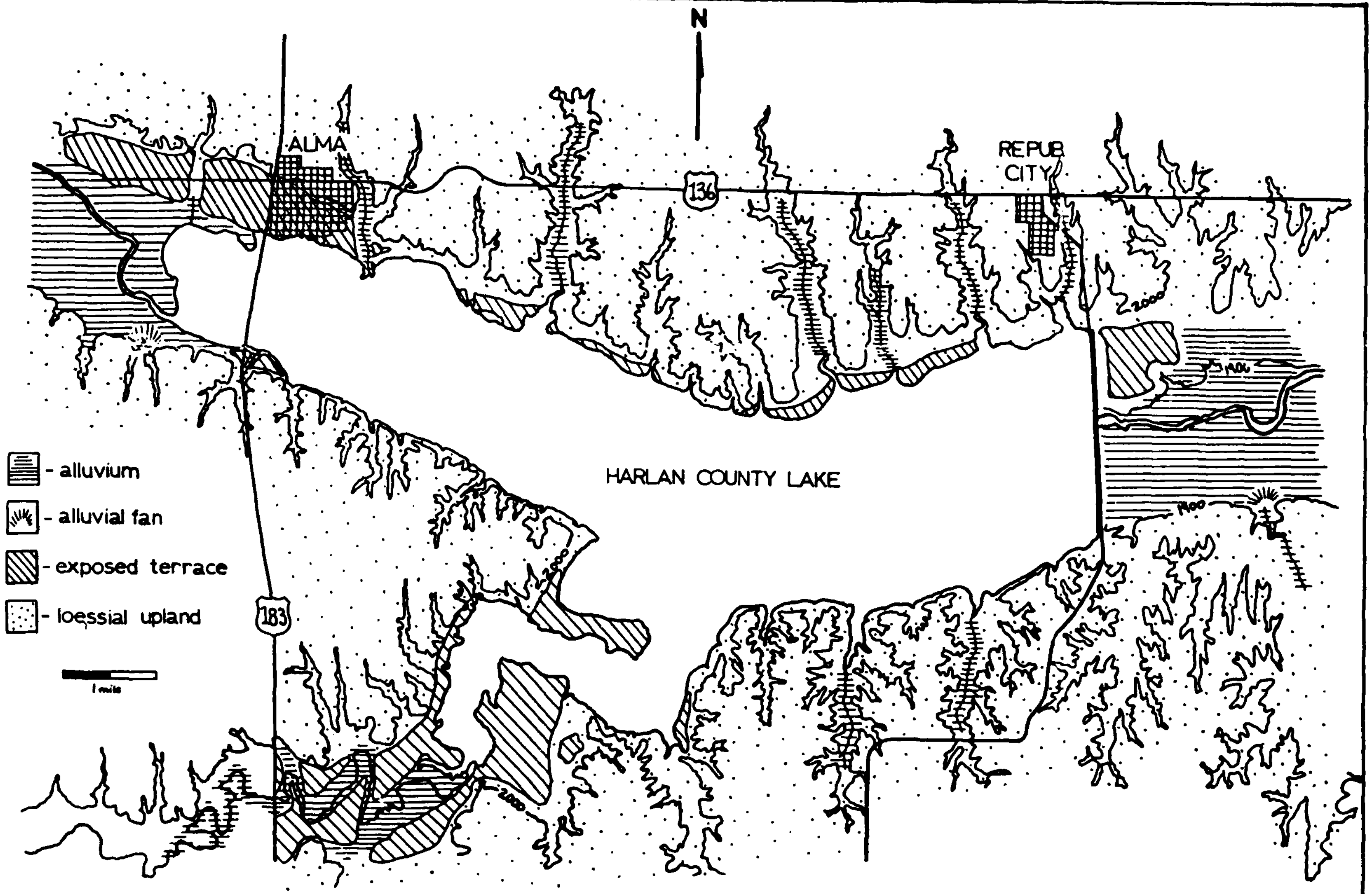
This chapter describes the terraces and soils found within the Harlan County Lake project domain. Unfortunately, recent inundation by lake waters has flooded all of the stream channel and floodplain landforms in the project domain. This did not allow for detailed field inspection of these units. A general reconnaissance was conducted in the upstream and downstream corridor of the Republican River Valley, but intensive investigation was limited to the project domain. Figure 8 illustrates the geomorphic provinces that were mapped in the project area.

Terraces

Several prominent terraces have been outlined and classified in the major fluvial systems in Nebraska. Early researchers (Schultz et al. 1951; Schultz et al. 1948) had identified a series of seven major terrace deposits (designated from youngest to oldest as T0, Tl, T2a, T2b, T3, T4 and T5) with ages ranging from Nebraskan to Recent times. In order to avoid confusing correlations, the observed terrace deposits were classified according to this original scheme.

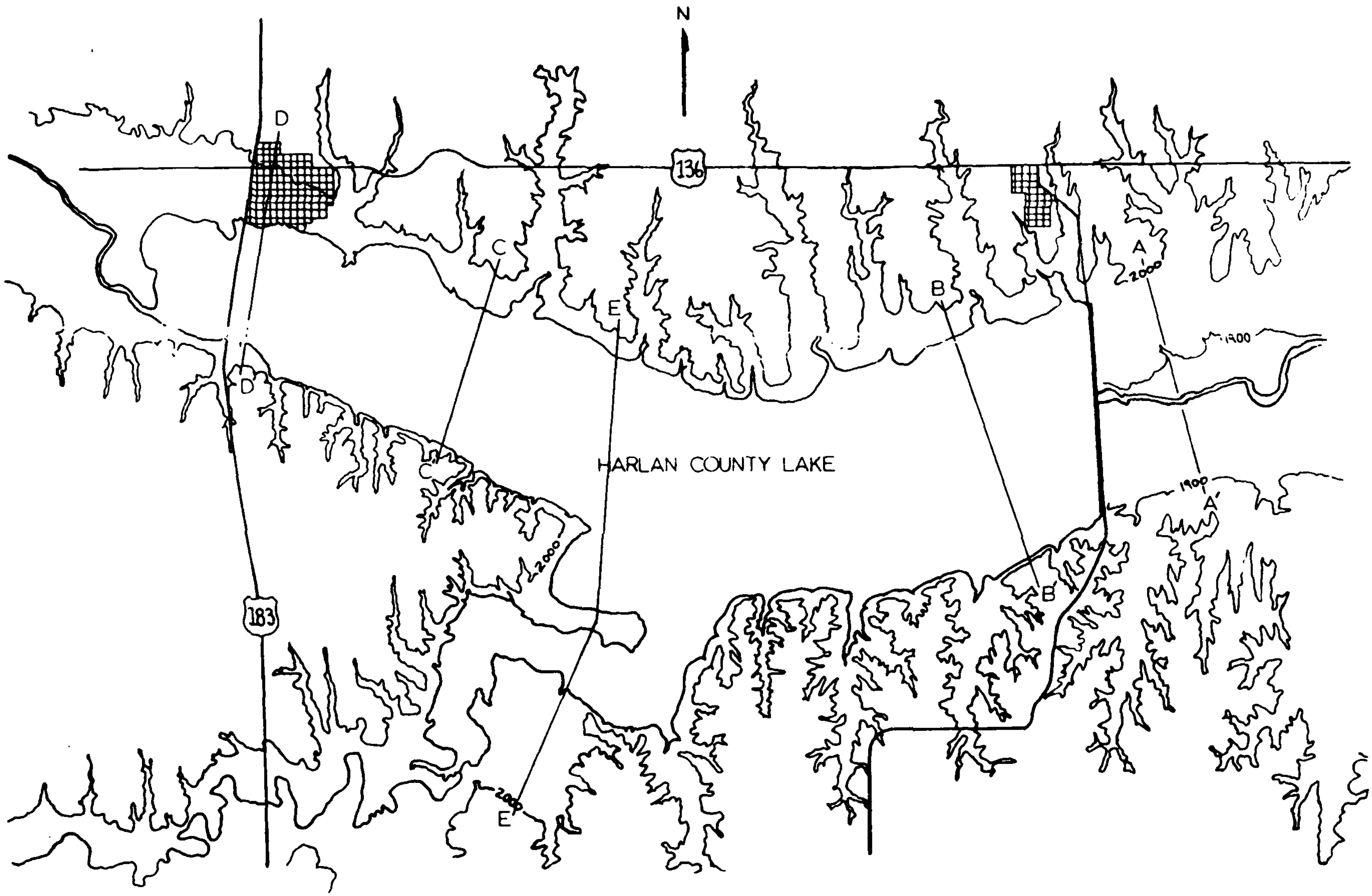
Of the several terrace deposits that occur in the major Nebraska river valleys, only the three most recently deposited terraces were observed in this section of the Republican River Valley (T2, Tl and T0 of Schultz et al. 1951). It is quite likely that the other terraces were developed in this area and have either been removed by erosion or buried under more recent deposits.

Figures 9 and 10 illustrate the relationships of terrace sequences through several valley profiles. The T2 and T0 terraces are evident in all of the profiles. The occasional absence of the Tl terrace from the valley is attributed to frequent erosional stages during pre-lake times. The two youngest terrace deposits in this area are not visible as they are currently flooded. They do occur in the upstream and downstream corridor. The T0 terrace is approximately five to ten feet above the modern stream channel. Its occurrence, as determined from pre-lake topographic maps, is sporadic and discontinuous. Dendrochronologic dating has determined the T0 terrace to be Late Recent in age, probably dating to more recent than A.D. 1,000 (Weakly 1946).



GEOMORPHIC PROVINCES OF THE HARLAN COUNTY LAKE AREA

Figure 8 Geomorphic provinces of the Harlan County Lake area, Nebraska.



Scale 1-65000

Figure 9 Cross-sections through the Republican River Valley.

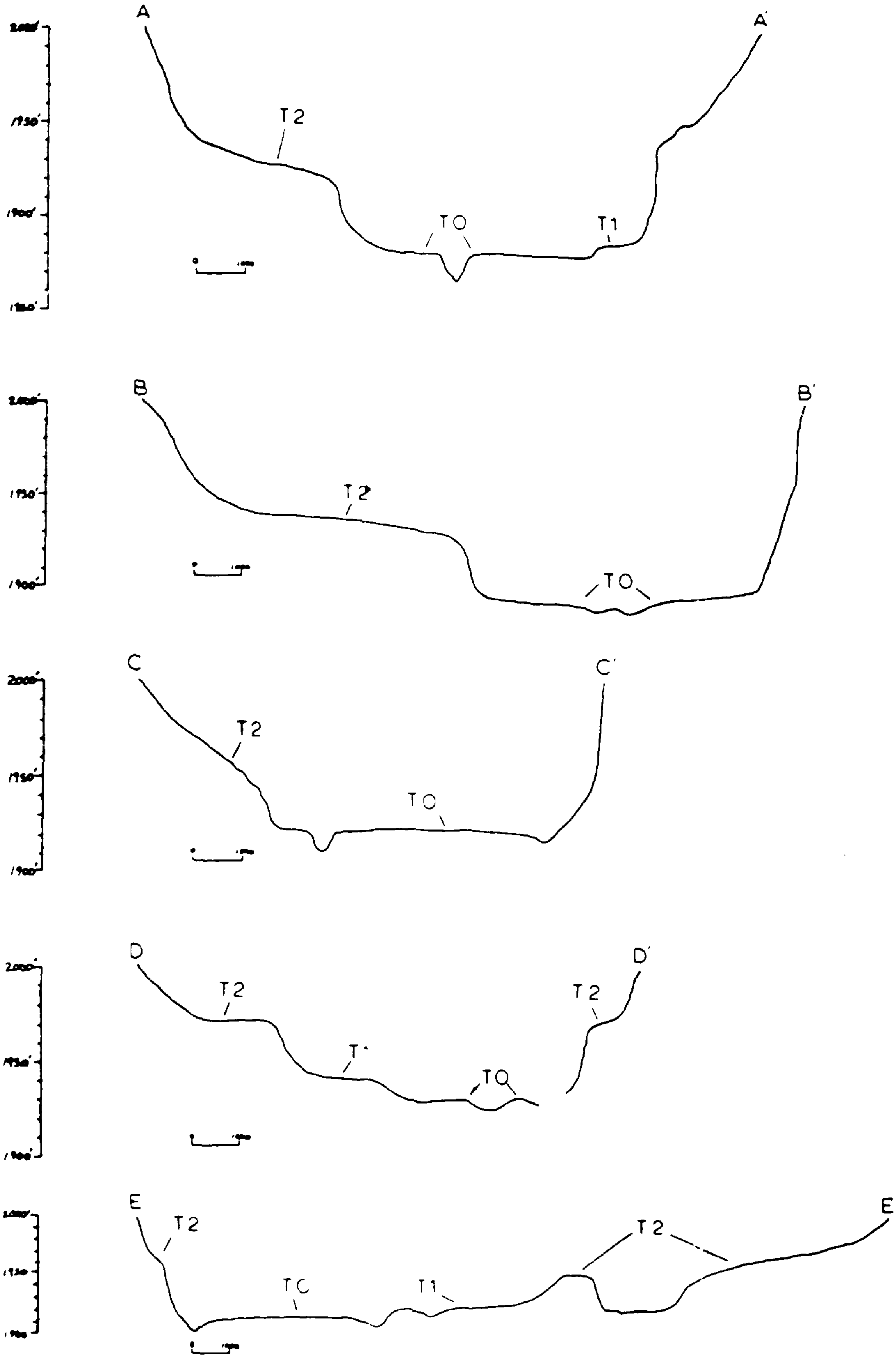


Figure 10. Cross-sections through the Republican River Valley.

The T1 terrace occurs approximately 10 to 30 feet above the modern stream level. Its occurrence is also sporadic. In a representative exposure, the soil profile consists of an Ap horizon with grayish-brown (10YR 5/2) color, friable, silty loam with a granular structure (approximately six inches thick); an A12 horizon with dark-gray (10YR 4/1) color, friable silt loam (approximately 18 inches thick); a B2 horizon with grayish-brown (10YR 5/2) color, friable, silt loam (approximately 8 inches thick); a B3 horizon with light brownish-gray (10YR 6/2) color, prismatic structure, hard, silt loam (approximately 8 inches thick); and a C horizon with light gray (10YR 7/2) color, hard, silt loam (approximately 20 inches thick).

The T1 terrace has been radiocarbon dated at 1150.400 B.C. (Libby date for the base of the Soil Y Complex). Radiocarbon dates of the T1 terrace from other locations in Nebraska are 99.180 and 725.280 B.C. (Libby 1955). These radiocarbon dates for the T1 terrace suggest a Recent age for this deposit.

The oldest terrace present (T2) is approximately 30 to 60 feet above the modern stream level in the upstream and downstream corridor of the Republican River Valley. This terrace consists of two distinct chronologic units termed T2a (youngest) and T2b (oldest). Radiocarbon dates obtained from paleosol horizons and charcoal within the terrace deposits (Arnold and Libby 1951) suggest a Late Wisconsinan age of approximately 7,000 to 9,000 B.C. The occurrence of the Brady soil at different stratigraphic levels within the T2a and T2b deposits suggests that the T2b terrace was cut and filled within the T2a deposit. Good exposures of this terrace deposit occur along the south shore of Harlan County Lake near site 25HN31 and on the north shore near site 25HN53. The exposure at the latter site reveals thin gravel seams and finely laminated silt beds in the upper 1.5 feet of the deposit. It was noted in the field that, at a depth of approximately 1.3 feet, a rusty beer can was excavated between two sand and gravel seams, attesting to the recent aggradation of the terrace surface and the relatively energetic sedimentation rate occurring on this deposit. The sedimentation is attributed to the presence of the old town site of Republican City adjacent to site 25HN53.

Data on the frequency and intensity of flooding has been recorded along the Republican River at Bloomington, Nebraska by the Kansas City Corps of Engineers from 1929 to 1947. Figure 11 illustrates the results of this compiled data. Essentially what this data means is that every five years, on the average, a flood with a head wall volume of

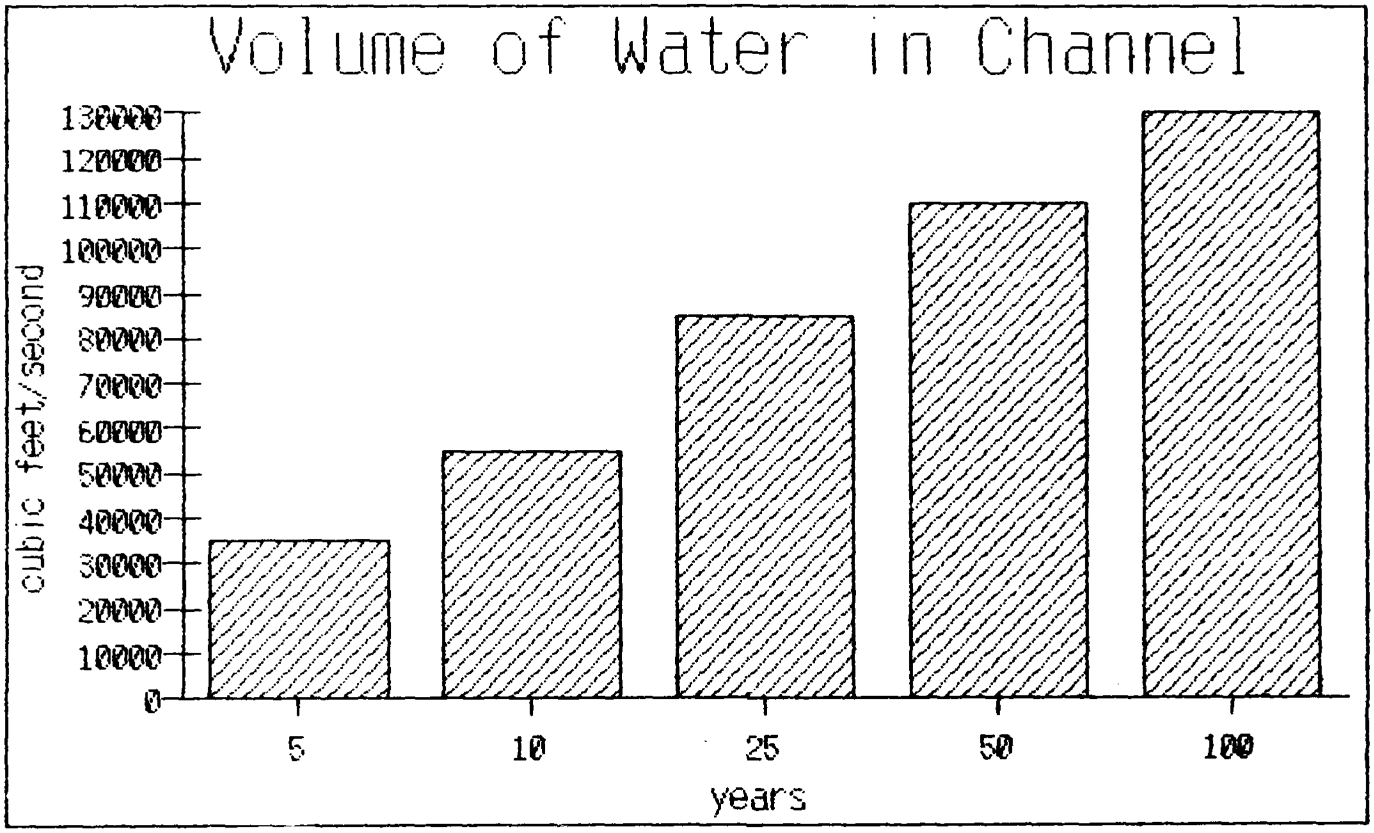


Figure 11. Data on frequency and intensity of flooding along the Republican River, Nebraska.

35,000 cubic feet per second (cf/s) will occur in the Republican River Valley. At 100 years a flood with a volume of 130,000 cf/s occurs. This, obviously, is a flood of major proportions. One such flood was recorded in the early 1900's as a wall of water swept down the Republican Valley "from bluff to bluff" as some of the more established residents of the community recall. It is important to note that these values were determined before the Harlan County Dam and other upstream flood control structures were built and are not applicable to present day conditions. These data do illustrate, however, the frequency and intensity of flooding (and subsequent terrace building) in the valley prior to completion of the Harlan County Dam.

Recent historical records show that the terrace deposit on which site 25HN53 occurs was the former location of Republican City before it was moved to its present location. The Burlington Northern Railroad line that presently runs about one mile north of Harlan County Lake was also built on this terrace deposit. This accounts for the large load of debris (slag, bricks, concrete and wood) that litters the shore near this site.

Other exposures of this terrace occur above the pre-lake confluence of the Republican River and Prairie Dog Creek along White Cat Point and to the south of the point. The soil types that have developed on this terrace are very similar to the soil types that have developed on the T1 terrace. The soil horizon is massive to crudely bedded with lenses of pebbly, silty sands occurring near the base in many localities.

In at least two locations several paleosols (up to three) are visible in the terrace cut-banks. These paleosols are horizontally continuous, have variable thicknesses between exposures, and were primarily observed in the terrace deposit cut-banks. Rare occurrences of these paleosol sequences were observed within some of the truncated (through lake shore erosion) upland loess hills that border the lake (southwest shore), but it is most likely that these soils developed on colluvial sediment washing down the slope.

The occurrence of these features in the T2 terrace and their relative stratigraphic position suggest correlation with soil horizons Z', Z and Y that have been previously described in the T2 terrace (Schultz et al. 1951; Schultz and Stout 1948; Schultz, Lueninghoener and Frankforter 1948). These soil horizons are Recent in age with the Z' horizon representing the modern soil horizon.

Soils

Several different soil associations have developed in the various environments that occur in the Harlan County Lake area. Two general soil associations are recognized in this area: (1) the Holdrege-Coly-Uly-Nuckolls soils that have developed in the loessal uplands and (2) the Hord-Cozad-Hall soils that have developed on major stream terraces (Figures 12 and 13, Table 3). Several floodplain soil horizons, not observable in the Harlan County Lake project domain, were investigated in the upstream and downstream corridor.

Holdrege, Coly and Uly soils primarily develop in Peoria/Bignell loess. They mantle the crests and divides of the loessal hills. Nuckolls soils develop in Loveland loess and, therefore, occur usually on steeply sloping to sloping drainageways where Loveland loess is exposed. This soil group varies in composition from a dark gray silt loam to a grayish-brown silt loam surface horizon. A transition layer of light brownish-gray to grayish-brown silt loam is present in Coly horizons. The underlying material varies from a light gray silt loam to a pale brown silt loam. Representative soil profiles of these units are described below.

Holdrege series

Ap - 0 to 7 inches (occasionally 14 inches), gray 10YR 5/1) silt loam, friable, slight reaction.

A12 - 7 to 14 inches, dark gray (10YR 4/1) silt loam, prismatic structure, friable, no reaction.

B1 - 14 to 18 inches, dark gray (10YR 4/1) silty clay loam, blocky to prismatic structure, little reaction.

B2t - 18 to 24 inches, grayish-brown (10YR 5/2) silty clay loam, blocky to prismatic structure, little reaction.

B3 - 24 to 34 inches, light brownish-gray (10YR 6/2) silt loam, subangular blocky to prismatic structure, friable, little reaction.

C - 34 to 60 inches, light gray (10YR 7/2) silt loam, massive, friable, strong reaction, soft calcareous pockets.

Coly series

A - 0 to 5 inches, grayish-brown (10YR 5/2) silt loam, crumbly structure, friable, slight reaction.

AC - 5 to 12 inches, light brownish-gray (10YR 6/2) silt loam, blocky to prismatic structure, friable, strong reaction.

C - 12 to 60 inches, light gray (10YR 7/2) silt loam, massive, friable, strong reaction.

Uly series

A - 0 to 10 inches, dark gray (10YR 4/1) silt loam, prismatic to granular structure, no reaction.

B - 10 to 16 inches, grayish-brown (10YR 5/2) silt loam, prismatic to blocky structure, some reaction.

C - 16 to 60 inches, pale brown (10YR 7/3) silt loam, massive, friable, strong reaction.

Nuckolls series

A - 0 to 7 inches, grayish-brown (10YR 5/2) silt loam, granular structure, friable, no reaction.

B21 - 7 to 10 inches, grayish-brown (10YR 5/2), silt loam, granular structure, friable, no reaction.

B22 - 10 to 16 inches, grayish-brown (10YR 6/3) silt loam, prismatic to blocky structure, friable, no reaction.

B3 - 16 to 32 inches, pale brown (10YR 6/3) silt loam, prismatic to blocky structure, friable, slight reaction.

C - 32 to 60 inches, pale brown (10YR 6/3) silt loam, massive, prismatic to blocky structure, friable, strong reaction, white calcareous stains on structures, fractures, and root holes.

Hord-Cozad-Hall soils develop primarily on nearly level to gently sloping stream terraces and footslopes that occur along the fringes of the lake. The Prairie Dog Creek branch of Harlan County Lake has the most extensive occurrence of these soil types. The Hord and Hall soils tend to develop on high stream terraces. They have a thick surface layer of gray silt loam. The upper part of the subsoil consists of grayish-brown silty clay loam and the lower part is pale brown light silty clay loam. Cozad soils develop primarily on footslopes adjacent to uplands and on stream terraces. They have a thick surface layer of grayish-brown silt loam and a thin subsoil of brownish-gray silt loam. The underlying material is light gray, calcareous silt loam. Representative soil profiles of these units are described below.

Hord series

- Ap - 0 to 6 inches, grayish-brown (10YR 5/2) silt loam, granular structure, friable, no reaction.
- A12 - 6 to 24 inches, dark gray (10YR 4/1) silt loam, prismatic to granular structure, friable, no reaction.
- B2 - 24 to 32 inches, grayish-brown (10YR 5/2) silt loam, prismatic to blocky structure, friable, slight reaction.
- B3 - 32 to 40 inches, brownish-gray (10YR 6/2) silt loam, prismatic to blocky structure, friable, reaction.
- C - 40 to 60 inches, light gray (10YR 7/2) silt loam, massive, friable, strong reaction, lime accumulations in root and bore holes.

Cozad series

- Ap - 0 to 5 inches, grayish-brown (10YR 5/2) silt loam, crumb structure, friable, no reaction.
- A12 - 5 to 10 inches, grayish-brown (10YR 5/2) silt loam, friable, no reaction.
- B2 - 10 to 16 inches, grayish-brown, (10YR 5/2) silt loam, subangular blocky structure, friable, no reaction.
- C1 - 16 to 24 inches, light brownish-gray (10YR 6/2) silt loam or very fine sandy loam, massive, friable, slight reaction.
- C2 - 24 to 36 inches, light gray (10YR 7/2) silt loam or very fine sandy loam, massive, friable, strong reaction.
- C3 - 36 to 42 inches, light gray (10YR 7/2) silt loam or very fine sandy loam, massive, friable, strong reaction.
- C4 - 42 to 60 inches, light gray (10YR 7/2) silt loam or very fine sandy loam, friable, strong reaction.

Hall series

Ap - 0 to 6 inches, gray (10YR 5/1) silt loam, crumbly structure, friable, no reaction.

A12 - 6 to 18 inches, gray (10YR 5/1) silt loam, prismatic to granular structure, friable, no reaction.

B1 - 18 to 22 inches, grayish-brown (10YR 5/2) silty clay loam, prismatic to subangular blocky structure, friable, no reaction.

B21t - 22 to 28 inches, grayish-brown (10YR 5/2) silty clay loam, prismatic to blocky structure, firm, no reaction.

B22t - 28 to 34 inches, brown (10YR 5/3) silty clay loam, prismatic to blocky structure, firm, no reaction.

B3t - 34 to 46 inches, pale brown (10YR 6/3) light silty clay loam, prismatic to subangular blocky structure, friable, no reaction.

C - 46 to 60 inches, light gray (10YR 7/2) silt loam, massive, friable, slight reaction.

The McCook-Munjor-Inavale association develops deep, loamy soils on the bottom lands along the Republican River. Although not exposed in the Harlan County Lake project domain, they were observed in the upstream and downstream corridors. Small horizons of Leshara, Hobbs and Platte soils also occur in this environment. Broken alluvial land exists in the upstream and downstream corridors of the Republican River Valley and along its tributary streams.

Of the twenty eight sites investigated for this project, all occur within one of two soil associations: (1) the Hord, Cozad and Hall group (stream terraces and footslopes) and (2) the Holdrege, Coly, Uly, and Nuckolls group (loessal uplands). Some of the sites occur on the hilltops and divides of the loess-mantled uplands with cultural material occurring within the Holdrege-Coly-Uly-Nuckolls soil profile itself (i.e., sites 25HN5, 25HN6, 25HN14, 25HN16, 25HN36, 25HN42, 25HN51, 25HN52, 25HN54, 25HN60 and 25HN124). At several of these sites cultural remains were observed on the ground surface.

Most of the other sites investigated during this project occur within the T2 terrace deposit (i.e., sites 25HN12, 25HN31, 25HN33, 25HN37, 25HN38, 25HN39, 25HN40, 25HN53, 25HN57, 25HN60, 25HN62 and 25HN125) within or beneath the Hord-Cozad-Hall soil horizon. Occasionally, shoreline erosion has cut benches into this deposit washing cultural evidence onto and along the limited beach (as is the case near site 25HN37). It is quite possible that

Table 3

Late Pleistocene and Holocene Chronology/Stratigraphy of Southcentral Nebraska

Age	Loessal Deposits	Soil Horizons	Terrace Deposits	Relative Ages	Source
		Soil Z'	T0	A.D. 950	Weakly (1946)
Recent		Soil Z			
		Soil Y complex	T1	1,150.400 B.C. 1,550 B.C.	Libby (1955) stratigraphic position
Late Wisconsinan					
	Bignell Loess		T2a	8,540 B.C.	Libby (1955)
		Soil YY (Brady Paleosol)			
Medial Wisconsinan		Soil X			
		Soil W (Farmsdale Paleosol)	T2b	10,000 B.C. to 12,000 B.C.	Schultz et al. (1970)
Early Wisconsinan				27,000 B.C.	Ruhe (1969)
	Peoria Loess		T3	33,000 B.C. to 38,000 B.C.	Schultz et al. (1970)

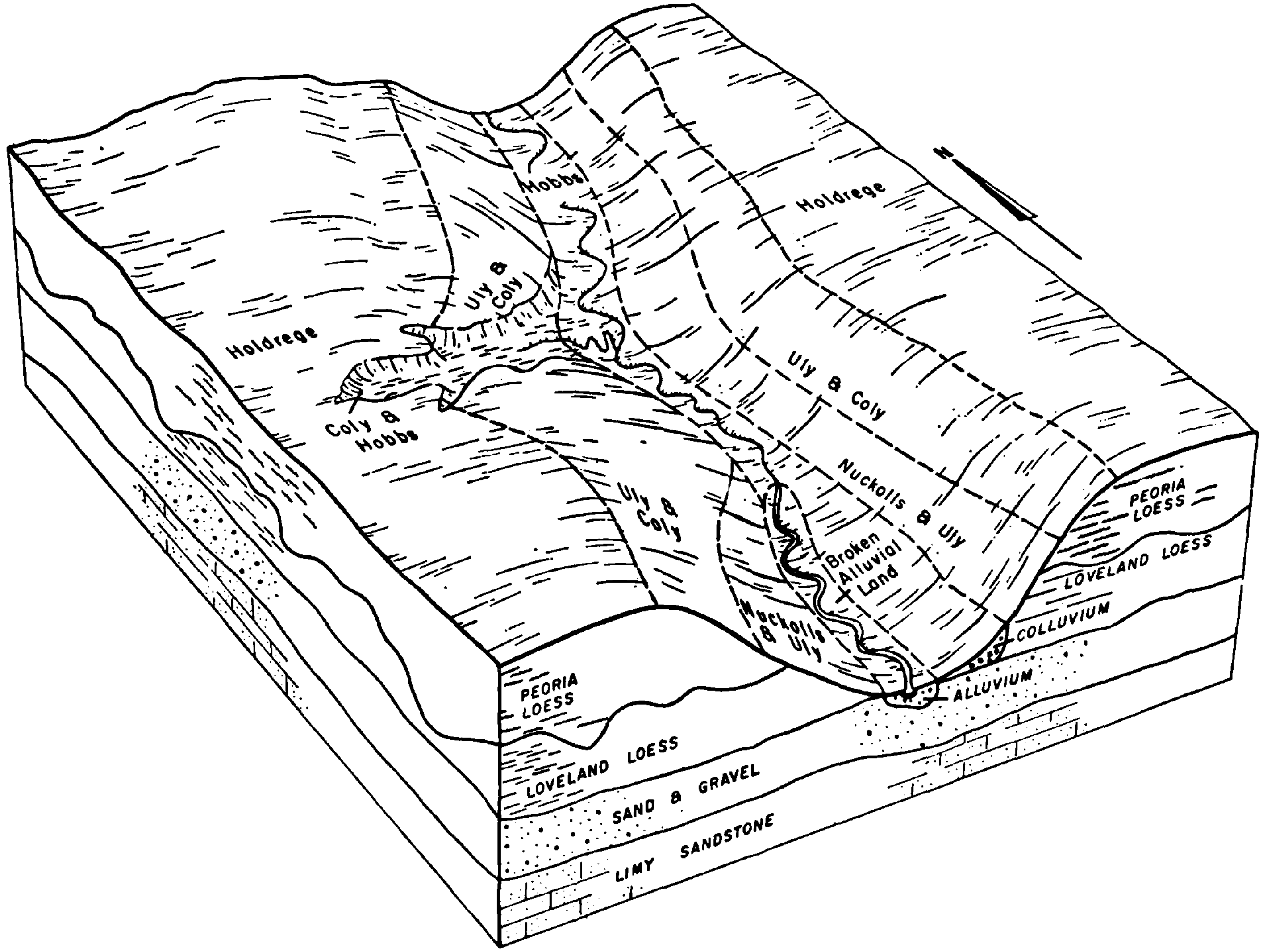


Figure 12. Relationship of the soils and parent material in the Holdrege-Coly-Uly association. (from Mitchell et al. 1974, Fig. 3).

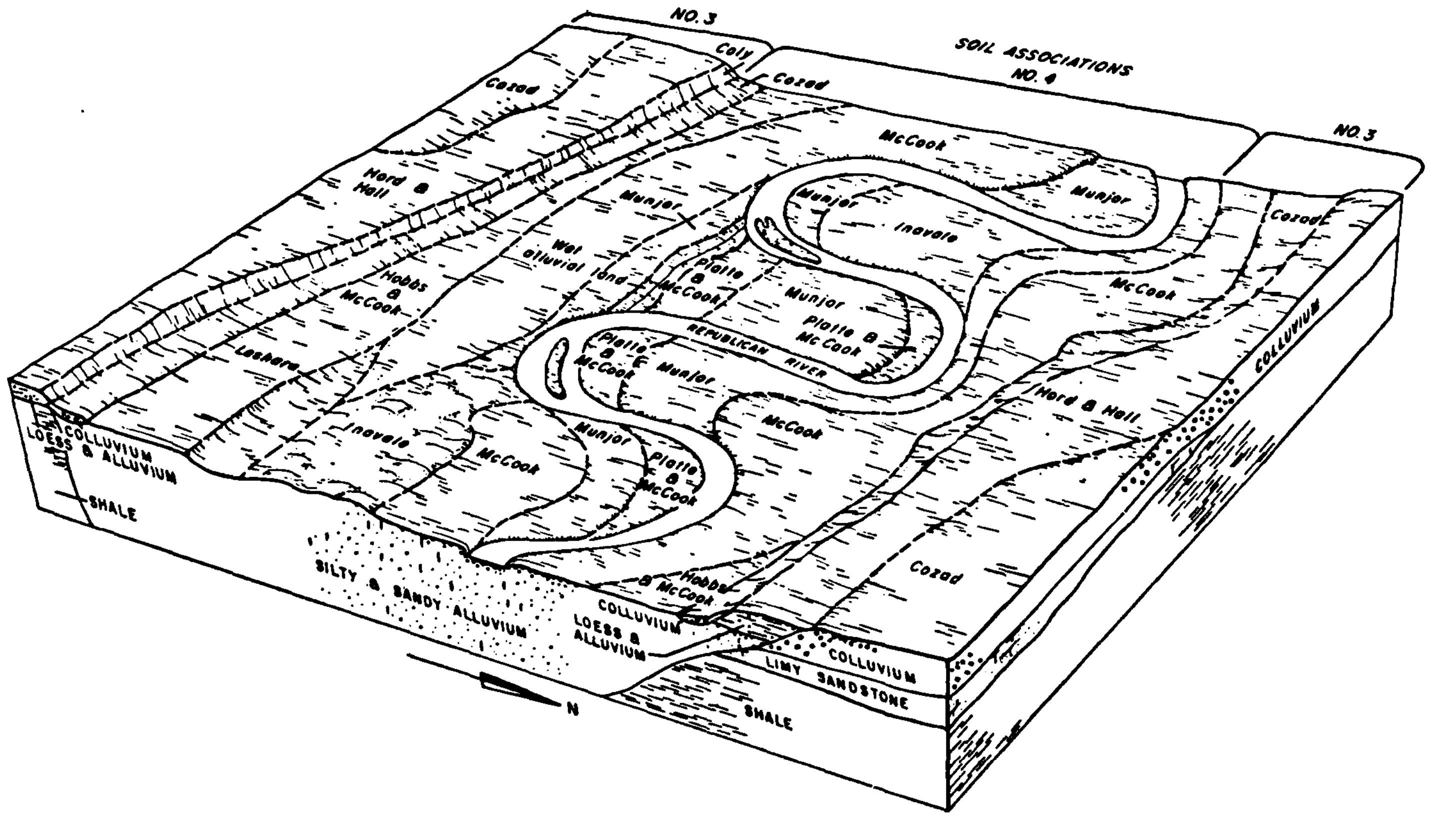


Figure 13. Relationship of the soils and parent material in the Hord-Cozad-Hall and the McCook-Munjor-Inavale associations. (from Mitchell et al. 1974, Fig. 4).

cultural material that has eroded out from the loessal uplands has been tansported to the lake and washed along the beach to much more recent settings such as the terrace shorelines.

Late Pleistocene/Holocene Chronology

By Early Wisconsinan times, this area had undergone several glacial cycles (primarily the Nebraskan, Kansas and Illinoian cycles) with several smaller scale cycles soon to follow. Although none of the glaciers actually covered the project area, glacially deposited sediments and outwsh in southcentral Nebraska attest to their existence and regional impact. Sands, gravels, silts, volcanic ash and clays had been deposited, eroded, transported, reworked and redeposited in the Grand Island, Sappa, Crete and Loveland Loess Formations. Intensive cycles of aggradation and erosion had produced distinct terrace deposits in major Nebraska river valleys (T5 and T4 of Schultz and Martin 1970; Reed and Dreezen 1965). Table 3 shows the relative chronologic/stratigraphic relationships of Late Pleistocene and Holocene sediments in the southcentral Nebraska area.

During Early Wisconsinan times, only the extreme northeast corner of Nebraska was covered by glacial lobes although the climatic and geologic effects of this glacier had left their imprint on the entire midwest as thick blankets of loess (Peoria age) were deposited. Radiocarbon dates obtained from Peoria loess in several localities has indicated an approximate basal depositional age of 27,000 B.C. with deposition terminating about 12,000 B.C. (Ruhe 1969). In the late stages of this glacial period, an apparent increase in precipitation caused deep dissection of major drainage passages in the midwest cutting another distinct terrace deposit (T3 of Schultz et al. 1970; Reed and Dreezen 1965). This terrace deposit, although recognized in other portions of the Republican Valley, was not observed in the project area.

At the start of Medial Wisconsinan times, a relatively short interglacial period occurred that allowed for a weak soil horizon to develop (soil W of Schultz et al. 1970); Farmsdale Interstadial soil of Reed and Dreezen 1965). This soil horizon was not observed in the project area. This short interglacial period was followed by, another minor episode of glacial activity (the Tazewell glacial period of Schultz et a. 1951) that again deposited thick sheets of loess (continuation of Peoria loess) on the plains of Nebraska. During the decline of this glacial period increased precipitation dissected much of the landscape and produced another distinct river terrace (T2a and T2b of

Schult et al. 1970; Reed and Dreezen 1965). The relatively long interglacial period encouraged soil development and a distinct soil horizon (the Brady Interstadial Soil) was developed. The Brady soil (correlated with Soil horizon YY of Schultz et al. 1951) has yielded a radiocarbon age of 8,543.1500 B.C. (Libby 1955). Soil YY (Brady Paleosol) is a significant stratigraphic horizon in western Nebraska as it contains one of the first signs of evidence of humans in the Late Wisconsinan stratigraphic sequence and represents a time of relative stability conducive to soil formation (Schultz, Lueninghoener and Frankforter 1948; Brice 1966). The Brady Paleosol occurs in the Harlan County Lake project domain, specifically at the North Cove site (25HN164) that is exposed in a large cut bank. The paleosol occurs at the base of the terrace deposit at that location (see Chapter 7.2 25HN164).

Preceding this second Wisconsinan interglacial period, deposition of silt and fine sand (the Bignell loess) in central Nebraska occurred. This was contemporaneous with another short glacial epoch (Cary stage of Schultz et al. 1951) to the north and east. Bignell loess caps most of the loessal uplands that occur in the Harlan County Lake project domain. Radiocarbon dates on small gastropods occurring in the Bignell Loess suggest a Late Wisconsinan age of 9,000 to 4,000 B.C. (Frye, Willman and Glass 1968).

At the close of this glacial period, a continuing period of aggradation followed by dissection produced another physiographic terrace deposit in major midwest river systems (T2a of Schultz et al. 1951). The T2a terrace is believed to be a slightly younger cut and fill deposit within the existing T2b terrace.

Evidence of these T2 terrace deposits occurs in the Harlan County Lake project domain on the north side of the valley. Specifically, the town of Alma and the original (and subsequently flooded) town site of Republican City are located on the T2 terrace (Figure 8). The upstream channel of Prairie Dog Creek, approximately four miles southwest of the confluence of the Republican River and Prairie Dog Creek, meanders through remnants of the T2 terrace. The occurrence of the T2 terrace along the upper reaches of the Prairie Dog Creek valley walls indicates that the alluvial system had existed prior to deposition of the terrace. This gives a minimum age of approximately 12,000 B.C. (Medial Wisconsinan) to the Prairie Dog Creek alluvial system.

The absence of the T2 terrace from the valley walls of the smaller tributaries of Harlan County Lake (e.g., Cook Creek, Methodist Creek, Tipover Creek, Mill Creek, Patterson

Creek, Bone Creek and Crystal Creek) suggests a relatively recent age for these small drainage systems. If a Late Wisconsinan Age is applied to final deposition of the T2 terrace then these small tributaries can be considered Holocene in age.

During the Late Wisconsinan time loess was again being deposited (continuation of the Bignell phase) with deposition and floodplain aggradation continuing throughout the period (Mankato Glacial Period of Schultz et al. 1951). A subsequent soil horizon (soil Y of Schultz et al. 1951) developed in this newly formed terrace. The occurrence of several weakly developed soil horizons at this stratigraphic level are considered to be a result of fluctuations in soil forming conditions and climate influenced by glacial activity to the north. Evidence of this soil complex occurs in the Tl and T2 terrace deposit (of Schultz et al. 1951; Reed et al. 1965). Radiocarbon dates obtained from this deposit in the Republican River Valley range from 99.180 to 2,200.350 B.C. (Libby 1955).

A younger Recent terrace has been reported in major central Nebraska river systems (T0 of Schultz et al. 1951). This terrace is considered to be Late Recent in age (more recent than A.D. 1,000) based on dendrochronology and radiocarbon dates (Schultz et al. 1970) and its proximal relationship with present day stream channels and floodplains.

Neither of these two terrace deposits (Tl and T0) were directly observed in the Harlan County Lake project domain, primarily due to the submerged topographic location of these deposits within the lake. Using pre-lake topographic maps, however, the occurrence and locations of these deposits have been identified (Figure 10).

Several recent soil horizons have developed on the T2 terrace that has been preserved in the project area (primarily the T2 terrace). The occurrence of the Z and Z' soil horizons (from Schultz et al. 1951) have been reported in excavated exposures during lake construction and are presently exposed in several cut-banks of the T2 terrace near sites 25HN31, 25HN33 and 25HN62 and along the southwest shore of the lake.

Summary

Although several terrace deposits have been recognized in Nebraska river valleys, only the three most recently deposited terraces were observed in the Harlan County Lake area. These three terraces are T2, Tl and T0 of Schultz et al. (1951). Other terraces were likely to have been developed in this area and have either been removed by erosion or buried under more recent deposits.

Two general soil associations are recognized in the project domain: (1) the Holdrege-Coly-Uly-Nuckolls soils that have developed in the loessal uplands and (2) the Hord-Cozad-Hall soils that have developed on major stream terraces. Several floodplain soil horizons, not observable in the Harlan County Lake project domain, were investigated in the upstream and downstream corridor. The archaeological sites investigated during the project occur on either of the above soil associations. Sites situated on loessal soils tend to be either at or near the surface or shallowly buried. In contrast, sites situated on alluvial soils may occur at any depth depending upon the terrace on which they occur.

Chapter 5

Culture History

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Introduction

Table 4 shows known cultures defined in the Central Great Plains and that may occur within the Harlan County Lake area. There is no evidence that humans originated in the New World and initial entry into North America is the subject of much debate. Although a very small number of controversial sites and some researchers suggest a presence prior to 60,000 years ago, most data and researchers argue for an initial entry during the Mid-to-Late Wisconsinan Stage of the Late Pleistocene. The Mid-Wisconsinan was a non-glacial interval dating from about 58,000 to 23,000 B.C. Since this was a period of wide human dispersals in other parts of the globe, Fladmark (1983:14, 38) suggests that this may have been a favorable period for human expansion into North America.

If human dispersals and adaptations did occur in the New World during Mid-Wisconsinan time, Fladmark (1983:38-39) lists three factors that would have affected the extent, rate and nature of those dispersals and adaptations. (1) The Bering Land-Bridge was submerged during most of this time period, emerging as a land-bridge approximately 23,000 B.C. A narrow (10 to 20 km wide, minimally), shallow strait separated Asia and North America. People may have crossed over the strait when it froze seasonally and/or with the aid of some type of watercraft. (2) Once on the North American mainland, the people were probably faced with a cooler Arctic environment than at present, although the tundra-like vegetation supported a variety of fauna. (3) Expansion along the Pacific coast would not have met with any significant maritime ecological transition, but population expansion into the interior of the continent would eventually have encountered new vegetation zones, particularly boreal-like coniferous-mixed forests of considerable depth that would have restricted ease of travel. Although Plains archaeologists have traditionally identified three Paleo-Indian complexes (Llano, Folsom and Plano), some researchers advocate an additional one, a pre-projectile or pre-Clovis complex (Krieger 1964:42-51).

Table 4

Prehistoric and Historic Cultures

date	cultural complex/historic tribe
A.D. 1870 - Present	Euro-American settlement
A.D. 1720 - A.D. 1870	Dakota (Sioux) Cheyenne Pawnee Apache
A.D. 1675 - A.D. 1720	Dismal River/proto-historic Apache
A.D. 1500 - A.D. 1750	Lower Loup/proto-historic Pawnee
A.D. 1500 - A.D. 1600	White Rock/early Kansa?
A.D. 1050 - A.D. 1350	Upper Republican
A.D. 900 - A.D. 1500	Smoky Hill
A.D. 400 - A.D. 900	Keith
50 B.C. - A.D. 400	Valley
4210 B.C. - 3250 B.C.	Logan Creek
6400 B.C. - 6000 B.C.	Fredrick
6800 B.C. - 6400 B.C.	Cody
7500 B.C. - 7000 B.C.	Alberta
8000 B.C. - 7600 B.C.	Meserve/Dalton
8000 B.C. - 7600 B.C.	Hell Gap
8000 B.C. - 7500 B.C.	Firstview
8500 B.C. - 8000 B.C.	Agate Basin
9000 B.C. - 8000 B.C.	Plainview Folsom
10000 B.C. - 9000 B.C.	Clovis
Prior to 10000 B.C.	Pre-Clovis

Pre-Clovis Complex (Prior to 10,000 B.C.)

The existence of a pre-projectile point horizon was first advocated by Krieger (1964:42-51). This is also referred to as a pre-Clovis stage since no known North American stone projectile points are universally accepted as older than Clovis (Standford 1982:203). As viewed by Krieger (1964:42), this stage is characterized by a core and flake industry similar to the Lower Paleolithic of the Old World. An important aspect of this stage is the failure or inability of the people to produce flat and thin artifacts such as projectile points or thin bifacial knives.

A number of sites have been assigned to this complex, including the Old Crow Basin of the northern Yukon Territory (Bonnichsen 1978, 1979; Irving 1978; Irving and Harington 1973; Irving et al. 1977; Morlan 1978, 1979, 1980, 1983), Calico Hills in California (Leakey et al. 1968; Simpson 1978, 1980), and Meadowcroft Rockshelter in Pennsylvania (Adovasio 1981; Adovasio, Gunn, Donahue and Stuckenrath et al. 1975, 1977a, 1977b, 1978; 1979-1980a, 1979-1980b; Adovasio et al. 1983). The antiquity of these sites is not generally accepted. Stanford (1982:204-205) identifies three major problems concerning acceptance of hypothetical early man sites: (1) reliability of radiocarbon dates; (2) the lack of or inadequately understood stratigraphy; and (3) the identification of artifacts or pseudo-facts. Since most pre-Clovis sites are dubious, Stanford (1982:205) lists four criteria to be met by a proposed pre-Clovis site: "(1) clearly defined statigraphy; (2) reliable and consistent radiometric dates; (3) consonance of the data from various relevant interdisciplinary researches; and (4) unquestionable human artifacts in indisputable association".

The pre-Clovis period is virtually unknown in Nebraska. The North Cove site (25HN164) on the north shore of Harlan County Lake may have a pre-Clovis occupation (see Chapter 7.1, 7.2). The site has a complex, but understood stratigraphic sequence that has been radiocarbon dated. The radiocarbon dates are stratigraphically consistent. The recovery of a worked piece of chert possibly in association with Late Wisconsinan biota lends support to its recognition as a potential pre-Clovis occupation.

In order to construct a picture of a possible pre-Clovis period in Nebraska, data from several nearby sites in adjacent states (e.g., Missouri and Colorado) are presented. The nearby, multicomponent Shriver site (23DV12) (Reagan et al. 1978; Reagan 1981; Rowlett 1981) in northwest Missouri is purported to have a pre-Clovis occupation. This is based on a thermoluminescence date of 12,855 B.C. for the bottom of the Bignell Loess zone that overlies an occupation manifested by a core and flake industry in Peorian Loess. The antiquity of the lowest occupation is supported by the age of the Peorian Loess that dates between 16,000 and 11,000 B.C. West (1983:375), however, indicates that the lithic assemblage is undiagnostic.

The Selby and Dutton sites (Stanford 1979, 1982:207-208, 1983:65-67; Graham 1981), located in northeastern Colorado, have yielded possible evidence for pre-Clovis occupations. Analyses of bone breakage patterns and predepositional bone modification indicate that some of the mammoth, camel, horse and bison bones recovered below a Clovis occupation may have been butchered and/or used as butchering tools. For the Dutton site, a radiocarbon date of 9,760 B.C. was obtained from mammoth bones recovered from a stratigraphic unit below the Clovis occupation.

The Lamb Spring site (Stanford et al. 1981; Stanford 1982:208, 1983:67-68), located in Douglas County, Colorado, may also have a pre-Clovis occupation. Bison, horse, camel and the remains of more than 24 mammoths were recovered from a layer below a Cody complex bison kill. The underlying level yielded a radiocarbon date on bone collagen of 11,190 B.C. Stanford et al. (1981:25) indicate that although bone dates are notoriously unreliable, they are usually younger than charcoal dates obtained from the same geologic horizons.

If the bone breakage patterns exhibited at the Selby, Dutton and Lamb Spring sites are cultural in origin, then, as suggested by other researchers (e.g., Bonnichsen 1979; Bonnichsen and Young 1980; Morlan 1980; Stanford et al. 1981), the earliest cultural tradition in North America includes bone flaking technology. Unfortunately, except for those purported pre-Clovis occupations containing only or almost exclusively bone, West (1983:368) notes that no two sites exhibit the same kind of cultural material. He finds this disturbing and presents an evaluation of pre-Clovis:

> Cultural standardization comparable to that which characterizes, for example, Mousterian-stage complexes of the Old World (Bordes 1968) is absent. Such a lack of regularization or patterning of culture generally at this late stage in human evolution is difficult to understand and to interpret.
>
> A more disturbing corollary of this problem is the low level of technology generally held to characterize pre-Clovis people. The period of

concern is, after all, late in the human record - Late Sangamon to Late Wisconsin. In the Old World, this same period of time finds humans with quite advanced Palaeolithic cultures (and for our purposes here that term specifically includes Mousterian and Mousterian-related cultures) (West 1983:369).

Llano Complex (10,000 - 9,000 B.C.)

The term 'Llano complex' was introduced by Sellards (1952:17). Although it was originally applied to a complex of artifacts found in direct association with extinct megafauna, especially mammoth, in the southern High Plains, in the present discussion it refers, geographically, to the Southwest and the entire Great Plains region. The most diagnostic artifact of this complex is the distinctive Clovis fluted projectile point, the earliest known projectile point in North America. The Clovis point occurs in excavated, dated occupations between 10,000 and 9,000 B.C. Haynes (1964) dates the occurrence of Clovis points even more narrowly between 9,500 and 9,000 B.C.

Surface finds of Clovis points occur in Nebraska. Excavations in Nuckolls County in 1931 yielded a Clovis point in association with a mammoth (Figgins 1931). The authors know of no other Llano complex sites that have been excavated in the state. Therefore, several Llano sites in nearby states will be described in order to provide a picture of what Llano components in Nebraska may be like. In 1932, the first clear evidence of mammoth procurement by early hunting peoples in North America was found at the Dent site (Figgins 1933). The site, located in Weld County, Colorado, is radiocarbon dated at 9,250 B.C. (Haynes 1964:145). Remains of at least 12 mammoths, 11 immature females and one adult male, and two Clovis points were recovered.

The Naco site (Haury et al. 1953) is a mammoth kill located in southeastern Arizona. The remains of a single sub-adult mammoth and eight associated Clovis points were recovered. Haury et al. (1953:17) date the site between 9,000 and 8,000 B.C. on the basis of the Clovis points and its geology.

The Lehner site (Haury et al. 1959) is also a mammoth kill located in southeastern Arizona near the Naco site. Excavations recovered the remains of nine immature mammoths and elements of horse, bison and tapir. Artifacts included 13 Clovis points and several butchering tools. Charcoal from two hearths yielded radiocarbon dates of 9,340 B.C. and 9,230 B.C.

Excavations in 1974 and 1975 (Saunders 1977) exposed remains of four more mammoths, two additional hearths and additional cultural material. Some mammals added to the list of fauna include camel, bear, canids and a jaguar-like felid. An analysis of the mandibles and lower dentition of the mammoths was compared to the age structures of living African elephant family units. It was concluded that the site represented a single family unit that was killed (Saunders 1977:61-62).

The Domebo site (34CD50) (Leonhardy 1966) is a mammoth kill in southwestern Oklahoma. Remains of a single immature female mammoth, two complete Clovis points and other tools were recovered. Radiocarbon dates of 9,270 B.C. and 9,250 B.C. were obtained from skeletal material.

The Colby site (Frison 1976, 1977, 1978, 1982), located in the Big Horn Basin of northcentral Wyoming, contained the remains of at least six immature and one nearly mature mammoth. Other mammals include bison, and extinct antelope and jackrabbit. Excavations uncovered two deliberately stacked piles of mammoth bones. Frison (1978:112) does not regard the Colby site as a single mass kill of a family unit but, rather, as a series of smaller kills. Frison (1982:200) suggests the bone piles represent frozen meat caches. A mammoth vertebra yielded a radiocarbon date of 9,250 B.C.

The Kimmswick site (Graham et al. 1981), located in eastcentral Missouri, is a mastodon kill. Two Clovis points and other chipped stone tools were found in direct association with the mastodon bones and other faunal remains. This site provides clear evidence for the association of the Llano complex and mastodon.

The methods employed by the nomadic hunters in killing mammoth and mastodon can only be conjectured. Once a young, old, or sick animal was separated from the herd, it could have been dispatched by a group of experienced hunters armed with Clovis or bone-tipped spears. Animals may also have been trapped at water holes, in marshes, in broken terrain or at slippery stream crossings and successfully attacked. In addition to mammoth meat, the diet of Llano peoples probably included smaller game animals, nuts, berries and tubers. Due to climatic change and/or overkill, mammoth became extinct and were replaced by bison as the main meat source for prehistoric Plains peoples.

Folsom Complex (9,000 - 8,000 B.C.)

The recognition and defining of the Folsom complex began in 1926 when paleontologists excavated bones of a fossil bison from a small tributary of the Cimarron River near Folsom, New Mexico. The discovery of 19 fluted points in direct association with the bone bed provided the earliest accepted evidence for the contemporaneity of people and extinct fauna in North America. The distinctive point form was named Folsom and the extinct bison were identified as Bison antiquus (Figgins 1927). Technologically, the Folsom point developed from the preceding Clovis point form. The distribution of Folsom points is generally defined as the High Plains region.

Although the Folsom site in New Mexico was the first accepted evidence for the contemporaneity of early hunting groups and extinct fauna in North America, the first discovery, by trained personnel, of a human artifact in direct association with extinct mammals in North America occurred at the 12-Mile Creek site (14LO1) in 1895. The site, located near the Smoky Hill River in western Kansas, yielded a projectile point from beneath a scapula (Williston 1902, 1905; Sellards 1947:965). This discovery, however, did not have any effect on the anthropological community (Rogers 1984:76-78; Rogers and Martin 1984).

Excavations were conducted in the 1930's at the Lindenmeier site in northeastern Colorado. A wide variety of stone tools were recovered, in addition to extinct fauna that included bison and camel (Wormington 1957:31-37). Other important sites with Folsom components include, but are not limited to, the Lubbock Lake, Lipscomb Bison Quarry, and Scharbauer sites in Texes, the MacHaffie site in Montana (Wormington 1957), and the Brewster, Agate Basin and Hanson sites in Wyoming (Frison 1978:23).

Plano Complexes (8,000 - 6,000 B.C.)

The Folsom complex is the last complex to extensively produce flutes on projectile points. The succeeding Paleo-Indian complexes, collectively referred to as Plano, are characterized by a variety of chipped stone projectile point and knife forms. The named projectile point forms that are attributed to Plano complexes and that have been reported in Nebraska include Plainview, Hell Gap, Meserve/ Dalton, Milnesand, Midland, Agate Basin, Scottsbluff and Eden. The sites are mostly mass bison kills, although a few campsites have also been reported. Changes in subsistence economies between Folsom and subsequent Plano complexes consisted of a shift from hunting now-extinct fauna (e.g., Bison antiquus, Equus sp. and Camelops sp.) to hunting modern, extant fauna. The earliest Plano complexes are frequently associated with extinct forms of bison, but by 7,000 B.C., a modern fauna occurred with all Plano complexes.

The literature regarding Plano complexes is almost exclusively concerned with large mammal kill and butchering sites. These sites include, but are not limited to, Olsen-Chubbuck (Wheat 1972), Casper (Frison 1974), Hudson-Meng (Agenbroad 1978), Horner (Frison 1978), Finley (Frison 1978), Jones-Miller (Stanford 1978), Lubbock Lake (Johnson and Holliday 1980; Black 1974; Green 1962), Colby (Frison 1978), Hanson (Frison 1978), Lime Creek (Davis 1962), Jurgens (Wheat 1979) and Agate Basin (Frison and Stanford 1982). Frison (1978:31-40) provides an excellent summary of the chronology of Plano complexes succeeding the Folsom complex and preceding the Archaic period. There are several Plano sites that have been excavated in Nebraska (e.g., Lime Creek, Red Smoke, Hudson-Meng and Signal Butte). Because of the greater amount of information regarding Plano complexes in adjacent states, information concerning them also comes from neighboring areas. The following summaries of Plano complexes are primarily from Frison (1978:31-40, 1983:109-124).

Agate Basin Complex (8,500 - 8,000 B.C.)

The Agate Basin complex is best represented at the Hell Gap and Brewster sites in Wyoming. The characteristic artifact of the Agate Basin complex is the Agate Basin point. The complex is restricted to the northern and northwestern part of the Central Plains (Frison 1978, 1983).

Plainview Complex (9,000 B.C. - 8,000 B.C.)

The Plainview complex is partially contemporaneous with the Agate Basin complex. The Plainview complex, however, is restricted to the Central and Southern Plains. The characteristic artifact is the Plainview point. Technologically, there may be a direct relationship between Plainview and Folsom points. The best sequence for the Plainview complex is at the Lubbock Lake site in Texas (Johnson and Holliday 1980; Frison 1983:114).

Firstview Complex (8,000 B.C. - 7,500 B.C.)

The Firstview complex is primarily based on radiocarbon dates from the Olsen-Chubbuck site in eastern Colorado (Wheat 1972:157) and zone I at the Lime Creek site (25FT4) located in southwestern Nebraska (Davis 1953, 1962). Initially, at the Lime Creek site Davis (1962) named this complex the Lime Creek complex on the basis of Scottsbluff, Milnesand and Plainview points associated with extinct bison (Bison antiquus) in zone I. Wheat (1972:144), however, reassigned the zone I occupation at the Lime Creek site to the Firstview complex that he origianlly designated for the technology represented at the Olsen-Chubbuck site. Wheat (1972) defines the Firstview complex as being characterized by the Firstview and San Jon point types and sees this complex occurring in place of the Cody complex in the southern and southcentral Plains. Excavations at the Red Smoke (25FT42) (Davis 1953) and Allen (25FT50) sites (Holder and Wike 1949) may also be assigned to this complex.

Hell Gap Complex (8,000 B.C. - 7,600 B.C.)

The best sequences for this complex are the Casper, Agate Basin, Sister's Hill, Carter/Kerr-McGee and Jones-Miller sites (Frison 1978, 1983). The Jones-Miller site is nearest to Harlan County, located in northeastern Colorado near the town of Wray. The characteristic artifact of the Hell Gap complex is the Hell Gap point. Technologically, the Hell Gap point may be derived from the Agate Basin point type. A Hell Gap point has been recovered from the Republican River in southcentral Nebraska (Myers 1977).

Meserve/Dalton Complex (8,000 B.C. - 7,000 B.C.)

The best sequences for this complex are from Graham Cave and Arnold Research Cave in eastern Missouri. This complex is characterized by the Meserve/Dalton point. The Meserve/Dalton complex is widespread and surface finds of Meserve/Dalton points have been reported in Nebraska. Technologically, these points probably developed from preceding fluted point forms found in the eastern woodlands.

Alberta Complex (7,500 B.C. - 7,000 B.C.)

The best sequences for this complex are the Hell Gap, Hudson-Meng and Fletcher sites. The characteristic artifacts of the Alberta complex are the Alberta point and the Cody knife. The recovery of a Cody knife at the Hudson-Meng site in northwestern Nebraska (Agenbroad 1978) is the earliest reported occurrence of this diagnostic tool form (Frison 1978, 1983).

Cody Complex (6,800 B.C. - 6,400 B.C.)

The best sequence for the Cody complex occurs at the Horner, Finley, Medicine Lodge Creek and Hell Gap sites. The characteristic artifacts are the Scottsbluff and Eden points and the Cody knife.

Fredrick Complex (6,400 B.C. - 6,000 B.C.)

The Fredrick complex, which is not well-defined and has few excavated components, is best represented at the Hell Gap site. The complex is characterized by lanceolate points with parallel-oblique pressure flaking and lacking shoulders and stems (Frison 1978, 1983). The occupation at zone III of the Lime Creek site (25FT41), located in southwestern

Nebraska, is assigned to the Fredrick complex by Wheat (1972:144). A Fredrick point has been recovered from the Republican River in southcentral Nebraska (Myers 1977).

Archaic Period (6,000 B.C. - A.D. 1)

Following the Plano cultures are a diversity of more regionally defined foraging cultures that have been radiocarbon dated between 6,000 B.C. and A.D. 1. In the eastern United States the Archaic period is divided into three subdivisions consisting of Early (6,000 to 5,000 B.C.), Middle (5,000 to 2,500 B.C.) and Late (2,500 B.C. to A.D. 1) (Chapman 1975; O'Brien 1984:39). The applicability of these subdivisions in Nebraska is currently debated. In the present volume the trinomial divisions of the Archaic period will not be used. In the Republican River basin the known occurrence of sites dating between 6,000 to 5,000 B.C. and 3,000 to 2,000 B.C. is generally lacking (Wedel 1986:72). The following are brief descriptions of defined cultural complexes in southcentral Nebraska that have been radiocarbon dated to the Archaic period.

Logan Creek Complex (4210 B.C. - 3250 B.C.)

The Logan Creek complex was originally defined by Kivett (1962) for the Logan Creek site (25BT3), located in northeastern Nebraska in Burt County. The first formal description of the Logan Creek complex was by Witty (1957) for the Logan Creek site. Another excavated site in Nebraska with a Logan Creek occupation is the Spring Creek site (25FT31), located in the Red Willow Reservoir in south-central Nebraska (Grange 1980). The Logan Creek complex is characterized by small-medium size side-notched triangular projectile points with grinding on the bases and notches and plano-convex side-notched scrapers. Faunal remains consist primarily of modern bison with a variety of other species present (Witty 1957; Kivett 1962; Grange 1980).

Additional sites that have artifact assemblages characteristic and/or similar to the Logan Creek complex occur in Wyoming and Iowa. Sites include the Hawken site (Frison 1978:41-44, 192-201) in Wyoming and the Simonsen (13CK61), Cherokee Sewer (13CK405), Ocheyedan (13OA401), Turin (13MN2), Pisgah (13HR2), Lewis Central School (13PW5), Lungren (13ML224) and Hill (13ML62) sites in Iowa (Anderson and Semken 1980:261-264).

Plains Woodland Period (A.D. 1 - A.D. 1000)

The Plains Woodland period is characterized by the earliest evidence of pottery in Nebraska and development and use of cultigens for food. The subsistence economy appears to have been one of more sedentary life-way with hunting and gathering possibly supplemented by the growing of crops. The following are brief descriptions of Plains Woodland complexes that occur in southcentral Nebraska and adjacent areas.

Valley Complex (50 B.C. - A.D. 400)

The Valley complex was originally defined in the Midwestern Taxonomic System as the Valley focus of an unnamed western-aspect, Lake Michigan phase, of the Woodland pattern (Hill and Kivett 1940:191). Kivett later tentatively assigned the focus to the Orleans aspect. Johnson (in press) has redefined the Valley focus as a variant of the Plains Woodland pattern. The Valley complex is found mainly in the eastern glaciated region and the sandhills area of Nebraska (Haas 1983:21).

Characteristic features of the complex include semi-subterranean, circular to sub-elliptical houses with central hearths, stemmed and corner-notched projectile points and a single pottery ware defined as Valley Cord Roughened (Kivett 1949; Haas 1983; Hill and Kivett 1940:181). Human burial patterns include three types: (1) burial in house-fill; (2) burial pits; and (3) burial mounds (Hill and Kivett 1940). Available data indicate the Valley complex is the earliest known Plains Woodland manifestation, antedating and partially overlapping the Keith complex. In addition, the Valley complex appears to be related to the Kansas City Hopewell complex that is located to the southeast in eastern Kansas and northwestern Missouri. O'Brien (1971:176) suggests the Valley complex may be "an attenuated extension and expansion of Kansas City Hopewell". The disappearance of the Valley complex remains a problem to be addressed in future research.

Keith Complex (A.D. 400 - A.D. 900)

The Keith complex was originally defined in the Midwestern Taxonomic System as the Keith focus within the Orleans Aspect of the Woodland Pattern by Kivett (1953:133-135). Johnson (in press) has redefined the Keith focus as a variant of the Plains Woodland pattern within the Willey and Phillips taxonomic system. The Keith complex is located in central Kansas and southcentral Nebraska and extends to the western parts of these states.

Most sites are small with larger, more permanently occupied villages also occurring. Characteristic features include small, circular pit houses. Large and small varieties of projectile points include stemmed, triangular unnotched, single side-notched with a basal notch, paired side-notched and paired side-notched with a basal notch forms. Pottery is characterized by one type defined as Harlan Cord Roughened Ware. Human burial patterns include three forms: (1) in house floors (Grange 1980:127); in earthen mounds (Crain 1956; Smith 1949:298-299) and (3) in ossuaries (Kivett 1953).

The subsistence economy consisted of hunting and gathering a wide variety of fauna (Grange 1980:125; Wedel 1959:397). Foraging of plant foods is inferred. The origin of the Keith complex is attributed to indigenous development of a Plains Woodland culture that was influenced by Hopewellian cultures to the east. The disappearance of the Keith complex is attributed to continual development into one or more of the Plains Village cultures found in southcentral Nebraska and northcentral Kansas.

Investigations in southcentral Nebraska and northcentral Kansas have included sites with Keith complex occupations (e.g., 25FT18, 14PH4, 25HK13) (Wedel 1986:96). The present study includes sites 25HN12, 25HN40 and 25HN125 as having Keith occupations (see Chapter 7.1).

Plains Village Period (A.D. 900 - A.D. 1850)

The Plains Village period consists of a variety of more sedentary, village farming cultures that includes the earlier Central Plains Tradition (i.e., Smoky Hill, Upper Republican and Nebraska complexes) and proto-historic and historic village (i.e., Pawnee) and nomadic (i.e., Plains Apache) tribes. The historical events for the development of, and alterations within, the Central Plains Tradition have been succinctly outlined by various authors (Gradwohl 1969; Grange 1968; Krause 1969; Ludwickson 1975, 1978). Today there are several different applications of the Midwestern and Willey and Phillips Taxonomic Systems in current use by archaeologists in the Plains. There is continued debate (Krause 1982; Blakeslee, Hotopp, Lippincott, Ludwickson, Witty 1982) regarding the placement of prehistoric cultures within the Plains into taxonomic systems. The following are brief descriptions of complexes that have been defined within the Plains Village Period that occur within or adjacent to the Harlan County Lake area.

Smoky Hill Complex (A.D. 900 - A.D. 1500)

Smoky Hill was defined as an aspect, by Wedel (1959:563-565), as a third division of the Central Plains Tradition that also includes the Upper Republican and Nebraska complexes (Krause 1969:95). The complexes are distinguished from each other mainly by geographical location and ceramic attributes (O'Brien 1984:59). The Smoky Hill complex is situated in the Smoky Hills and the northern

Flint Hills Physiographic Regions of northern Kansas and southern Nebraska (Johnson 1973:297).

Characteristic features include square houses with extended entryways that were erected on a sod-stripped ground surface (Wedel 1959:561, 563). Pottery is characterized by a single ware defined as Riley Cord-Roughened (Wedel 1959:183-184, 563-564). Characteristic stone tools include small, triangular projectile points that are notched or unnotched (Wedel 1959:561-562; Brown 1982).

The subsistence economy is believed to have been "divided about equally between maize horticulture and hunting" (Wedel 1959:566). A large variety of mammals, birds, fish and mussels were hunted and collected (Brown 1979). Cultivated species include maize, sunflower, marshelder and squash and wild species include hackberry and prairie turnips (Adair 1984; Brown 1979).

Wedel (1959:565) has suggested that Smoky Hill may be ancestral to the Upper Republican and Nebraska complexes. Analyses of radiocarbon dates for Cental Plains occupations (Roper 1976; Kvamme 1982) indicate a south-to-north and east-to-west trend in the occupation of sites assigned to the Central Plains Tradition. This supports the hypothesis that Smoky Hill developed into one or more of the later historic Plains Village societies.

Upper Republican Complex (A.D. 1050 - A.D. 1350)

The Upper Republican complex was first defined as the Upper Republican Culture by Strong (1935:2) and reclassified as the Upper Republican aspect by Wedel (1935). Subsequent research resulted in several changes in the taxonomic structure for the Upper Republican complex. Krause (1969:82-85) succinctly outlines these changes. The Upper Republican complex is located in the High Plains region of northwestern Kansas and southwestern Nebraska. A large number of sites have been excavated in Nebraska and Kansas. Wedel (1986:98-133) provides a detailed description of the Upper Republican complex.

Characteristic features include square to sub-rectangular earthlodges with rounded corners and extended entryways. Houses were built on the ground surface or only the ground cover was removed before their construction. Pottery consists of two forms based on tempering material: (1) grog (crushed sherd) and (2) sand (Wedel 1959:398-399; Carlson 1971). Characteristic stone tools include small triangular projectile points with no notches, single side notched, multiple-paired side notched and basal notched combinations

(Lippincott 1976). Human burial patterns include ossuaries (Strong 1935:103-114; Thies 1982) and individual primary interments (Wedel 1959:560). Some burial goods, consisting of pottery, shell beads, pendants and bone tubular beads, occur (Strong 1935:103-114; Thies 1982).

Krause (1970:106-108) reconstructs the settlement pattern as consisting of three forms: (1) small farming hamlets; (2) isolated households; and (3) seasonal campsites. Lippincott (1976, 1978:92) reconstructs a similar settlement pattern with some exceptions to Krause (1970). Hamlets and isolated households are not spacially or temporally separated but rather occur together in proximity to each other (Lippincott 1978:92). The subsistence economy was based on agriculture, gathering and hunting. Agricultural crops include maize, squash, beans and sunflower. A variety of wild plants were collected (Lippincott 1976:104; Smith 1969:59-60; Cutler and Blake 1969:61-62). Animals hunted and gathered include a variety of riverine and plains species (Falk 1969:39-51; Lippincott 1976:106-114).

The origin of the Upper Republican complex is not well known but may be related to earlier Plains Woodland cultures such as the Keith complex. The end of the Upper Republican complex is seen to change to subsequent Plains Village cultures. Ludwickson (1975, 1978) proposes the Loup River phase is a linear antecedent of the proto-historic Pawnee Lower Loup phase. He also sees the Loup River phase as representing an amalgamation of predominantly Upper Republican characteristics with lesser elements of Smoky Hill and/or Nebraska (Ludwickson 1975, 1978:94).

Sites investigated during the present project that have Upper Republican complex occupations include 25HN5, 25HN12, 25HN31, 25HN36, 25HN40, 25HN42, 25HN51, 25HN52, 25HN54 and 25HN60 (see Chapter 7.1). These sites represent small villages, hunting and gathering camps and an ossuary.

White Rock Complex (A.D. 1500 - A.D. 1600)

This complex was defined by Kiehl (1953) and Cummings (1953) as the White Rock aspect in terms of the Midwestern Taxonomic System. The aspect has two foci: the Blue Stone focus (Cummings 1953) and Glen Elder focus (Kiehl 1953; Rusco 1960). The Blue Stone focus was defined on the basis of excavations at the Green Plum (25HN39) and Blue Stone (25HN45) sites located along Prairie Dog Creek, Harlan County, Nebraska. The Glen Elder focus was defined on the basis of excavations at the Glen Elder (14ML1) and White Rock (14JW1) sites in northcentral Kansas. Marshall (1969) suggests combining the Blue Stone and Glen Elder foci into one designation, the Glen Elder focus.

The White Rock complex is restricted to northcentral Kansas and southcentral Nebraska. With the absence of radiocarbon dates, the complex is believed to date between A.D. 1500 and 1600 (Rusco 1960:43, 71, 75). Characteristic features include small houses with straight- walled and bell-shaped storage pits. Characteristic stone artifacts include small arrow points that are usually triangular, unnotched forms. Other, less common, forms include concave bases, single basally-notched, single side-notched and paired side-notched (Rusco 1960). Pottery is classified as belonging to one type defined as Walnut Decorated Lip Ware.

The settlement pattern consists of semi-permanent villages where agriculture was practiced and temporary hunting and gathering camps. The subsistence economy was based on hunting bison, deer, gathering wild plant foods and growing maize and possibly other cultigens. The origin of the White Rock complex is not well understood. Marshall (1960:7, 96) and Neuman (1963:293) believe the complex was derived from the Oneota complex that is located to the east. Rusco (1960) and O'Brien (1984) believe the complex is an extension of the historic Kansa into northcentral Kansas and southcentral Nebraska or a prototype of some other Siouan-speaking group. The disappearance of the complex may coincide with the historic documentation of the Kansa. In the present study the Green Plum site (25HN39) of the White Rock complex (Blue Stone focus) was reinvestigated.

Lower Loup Complex/Historic Pawnee (A.D. 1500 - A.D. 1876)

The Lower Loup complex is radiocarbon dated to A.D. 1500 to 1750 while the historic Pawnee are documented from A.D. 1750 to 1876. The Pawnee are considered among the best known Plains Village societies. The Lower Loup complex was first formulated by Strong (1935:2) as being proto-historic Pawnee. Following this original designation there have been several taxonomic changes that are best summarized by Grange (1968:14-15) and Ludwickson (1978:95).

Most information regarding the Pawnee is from investigations in Nebraska (Grange 1962, 1968; Ludwickson 1975, 1978; Strong 1935; Wedel 1936). Although the core area for the Pawnee is located at the confluence of the Loup and Platte Rivers in Nebraska, sites occur in southcentral Nebraska and northcentral and western Kansas (Marshall and Witty 1967; Roberts 1978; Smith 1949, 1950a, 1950b; Wedel 1936, 1959).

Characteristic features include two and possibly three distinct types of dwellings. More permanent villages have circular, semi-subterranean earthlodges with extended entryways. During nomadic bison hunts the Pawnee used the tipi. A third type of shelter used during the summer was a dome-shaped brush dwelling (Wedel 1936:43-51). Most villages have defensive earthworks surrounding them. Earthworks consisted of an earth or sod embankment with a ditch immediately in front of the embankment (Wedel 1936:54-55).

Characteristic pottery consists of 18 types defined by Grange (1962, 1968). Characteristic stone tools include small triangular, unnotched projectile points and diamond-shaped beveled knives. A large quantity of historic Euro-American trade materials occurs with historic Pawnee occupations (Roberts 1978; Smith 1950a; Wedel 1936, 1938). Human burial methods consists of primary flexed inhumations on the highest hills near each village or along the edges of ravines or banks of streams near the village (Wedel 1936:91-94).

The settlement pattern consists of small hamlets (two or three earthlodges) and villages (8 to 30 earthlodges) situated on high terraces and bluffs (Strong 1935; Wedel 1936). Temporary camps used during the bison hunts are not well known archaeologically. The subsistence economy was based on two main sources, maize and bison. Agriculture was practiced in the vicinity of the more permanent villages. In addition to maize the Pawnee grew beans, pumpkins and squash. A variety of wild plants were gathered for food (Wedel 1936:58-59). Two major tribal bison hunts were conducted each year. The first occurred after the second hoeing of the maize (i.e., middle of June) and before returning in September to harvest the cultivated crops. After harvest, or at the end of October, the winter hunt began with them returning to their villages in early April to plant their crops. The Pawnee's favorite hunting territory was western Kansas between the Republican and Arkansas Rivers.

The origin of the Pawnee is one of the best archaeologically documented culture-histories for the Great Plains. Strong (1935) and Wedel (1936, 1938) recognized the similarities in cultural material and features between the Upper Republican, Loup River, Lower Loup and Pawnee. The most recent summaries of the origins of the Pawnee have been done by Grange (1979) and Ludwickson (1975, 1978). Ludwickson (1975, 1978) demonstrates the necessary change in time, space and material culture that suggests the Upper

Republican of the Central Plains Tradition is the predecessor to the historic Pawnee. The Lower Loup complex is defined as proto-historic Pawnee (Grange 1968:6; Wedel 1936, 1938). The temporal range for the Lower Loup focus is approximately A.D. 1500 to 1750 which marks the historic Pawnee (Grange 1968:13, 1979:141; Ludwickson 1978:104-105). The historic Pawnee period is from A.D. 1750 to 1876 (Grange 1968:13). For detailed comparisons between these taxonomic divisions and information on the historic Pawnee one should consult Grange (1968, 1979), Parks (1979), Parks and Wedel (1985), Wedel (1938, 1986), Gallatin (1836), Craine (1958) and Weltfish (1965).

Dismal River Complex/Historic Plains Apache (A.D. 1675 - A.D. 1886)

The Dismal River complex was first defined by Strong (1935:215-217). Investigations in the late 1940's and early 1950's at White Cat Village (25HN37) in Harlan County, Nebraska (Champe 1949; Gunnerson 1960) yielded substantial information about large Dismal River village sites. Dismal River sites in Nebraska have been dated ca. A.D. 1675 to 1725 on the basis of dendrochronology, painted, southwestern pottery sherds and the presence of Euro-American trade goods. All of the archaeological and ethnographic evidence indicates the Dismal River complex represents Plains Apache groups (Gunnerson 1960; Wedel 1959, 1986). The Dismal River complex occurs in the High Plains physiographic region of Nebraska, Wyoming, Colorado, Kansas and the Southwest.

Architectural features include houses, pueblo structures, baking pits and trash-filled pits. House forms are represented best by those at White Cat Village (25HN37) (Champe 1949) and the Lovitt site (25CH1) (Hill and Metcalf 1941). Houses are circular semi-permanent structures, with extended entryways, that were built either on the surface of the ground or in shallow excavations. Pueblo structures have been discerned at two sites: (1) El Quartelejo (14SC1) in western Kansas (Williston and Martin 1899; Wedel 1959; Witty 1971, 1975) and (2) Glasscock site (29MO20) in northeastern New Mexico (Gunnerson 1969:25-30).

The subsistence economy was based primarily on hunting and secondarily on agriculture. A variety of prairie and riverine animal species were hunted and gathered (Champe 1949:289; Gunnerson 1960:245; Hill and Metcalf 1941:204; Wedel 1959:440-441). Fish remains are absent, which coincides with the Athabascan taboo against the eating of fish (Gunnerson 1960:245). A variety of wild plants were harvested (Gunnerson 1960:245; Hill and Metcalf 1941:205; Wedel 1959:440). Cultigens included maize and squash

(Gunnerson 1960:245; Hill and Metcalf 1941:204; Martin 1909:15; Wedel 1959:440; Williston and Martin 1899:111).

Three pottery wares have been defined for ceramics associated with Dismal River sites in Nebraska: (1) Lovitt Plain; (2) Lovitt Simple Stamped; and (3) Lovitt Mica Tempered (Metcalf 1949:75). Non-local pottery occasionally occur with Dismal River occupations. Most are types from the southwest pueblos from along the Rio Grande River in New Mexico (Wedel 1959:446-447). Characteristic stone tools include small, side-notched or unnotched, triangular projectile points. Euro-American trade items include fragments of iron and glass (Wedel 1959:461-462). Other trade items include turquoise beads and obsidian (Gunnerson 1960:251).

Human burial patterns are not well known but they include interments in baking pits (Gunnerson 1964:46-56; Hughes 1949:275; Carlson 1965:24-25). The settlement pattern consists of villages located along major streams while small hunting and gathering camps occur either near or at a distance from sources of water. Villages can be quite large (e.g., Lovitt site [25CH1] is about 190 hectares).

Dismal River peoples are believed to have been undergoing a transition from a nomadic life-way to a more semi-sedentary, semi-horticultural life-way. Dismal River sites date from approximately A.D. 1675 to 1725. No early Dismal River (i.e., ca. A.D. 1500 to 1650) sites have been identified. Based on the accounts of Spanish explorations in the High Plains there were nomadic peoples living in the region who are believed to be the ancestors to the Plains Apache (Gunnerson 1968:185). The origin of the complex is not understood, since the house form is unique and has no similarities to those found in the Plains, Southwest or Great Basin. Dismal River artifact assemblages have similarities with contemporaneous cultures in the Great Basin (i.e., Promontory culture), the Southwest (i.e., Pecos Pueblo), and Plains (i.e., Pawnee and Wichita) (Gunnerson 1960:252). Schlesier (1972) presents hypothetical events regarding the Plains Apache with use of ethnographic accounts and historic documentation. Disappearance of the Dismal River complex is attributed to historic documentation of the Plains Apache. With the disappearance of the Apache came the Cheyenne, Comanche, Dakota and Kiowa (Harrington 1941; Craine 1958).

Historic Period/Euro-American (A.D. 1720 - Present)

Although it is impossible to ascertain when the first Euro-Americans appeared in the Harlan County area, it is probable that both the Spanish and French visited Indian sites in this part of Nebraska before A.D. 1800. In August 1720, the ill-fated Villasur expedition was killed near the junction of the Loup and Platte Rivers, not far from the Harlan County Lake area. They may have passed near the White Cat Village site (25HN37), a Dismal River Plains Apache village (Thomas 1924), but this is mere conjecture. A. Andreas noted in his History of Nebraska, 1882, that the county had abundant sources of wildlife. Bison, beaver, wapiti and bears were common in the region. Water was abundant and timber was accessible. The French, who conducted an extensive trading empire of furs and pelts, moved further and further west and north as they depleted their resources. The Spanish, constantly fearful of French encroachments on their territory, conducted expeditions that periodically criss-crossed this part of Nebraska. The Villasur expedition was just such a group (Sheldon 1923). Neither cultural group, however, made any notable impressions on the region and, although the French moved their fur trading empire west, they probably did not reach the Harlan County area, as there were still plenty of beavers in the mid-nineteenth century when William F. "Buffalo Bill" Cody came on the scene.

The first United States expedition to reach the region was Lt. Zebulon Pike in 1806. Pike apparently came within eighty miles of the Harlan County area when he camped in late September at a Pawnee Indian village in present Webster County south of Red Cloud, Nebraska (Barry 1972). Shortly before Pike, Lt. Facundo Melgares led an expedition from Santa Fe to the northwestern limits of the Spanish Empire in order to meet with the Pawnees. Both parties left gifts, flags, and mules with the Pawnees before continuing their expedition. It would be conjecture, however, to state that either party came any closer to Harlan County (Barry 1972).

The Melgares 1806 expedition was the last thrust of Spanish influence in most of the West. U.S. expeditions and immigration parties in the next sixty years became more and more commonplace across southwest Nebraska. Relations with the Pawnee and Dakota (Sioux) tribes, however, worsened as time progressed. The constant encroachments on Indian hunting grounds and the removal of other Indian tribes from the eastern fringes of the Plains to the West often caused warfare and delayed permanent settlement of the region for several years.

The constant threat of attack from Indian bands in the Harlan County area, especially the Dakota, limited the Euro-American presence through the 1860's. Although parties of hunters ventured into the valley (like Cody and Harrington, see Buffalo Bill's Cave, Chapter 7.1), their visits were brief and tense. As Andreas noted, "the danger of attack from Indians was so great, that for a long time, no settlement could be made" (Andreas 1882:959). In the summer of 1869, a group of U.S. surveyors were attacked while surveying Township 2, Range 19, and all were killed. This took place near the mouth of Sappa Creek. This attack, however, was the last skirmish to be tolerated. When General Eugene Carr, commander of Fort McPherson, heard of the killings he decided to march and drive out the Dakota from the Republican River Valley once and for all. On July 11, 1869, he attacked and annihilated a party of Dakota on the Platte River. This attack put an end to most of the Indian troubles in the Republican River Valley and opened up the area for settlement.

Euro-American settlement was, in fact, a rapid development from that date on. In August 1870, a party of forty men composed the first settlers of Harlan County. They drew lots and began selecting farm sites near present Orleans and Alma. In September, J.W. Foster erected a cabin on his claim south of Alma, and this became the first Euro-American habitation in the county.

After inspecting their claims, most of the party returned to eastern Nebraska. A few stayed and built a stockade near the townsite of Melrose, where they lasted out the winter. In 1871, most of the original party returned and were accompanied by new settlers who had heard optimistic accounts of the Republican River Valley. They organized a colony, dubbed the "Cheyenne Colony", and the majority of these settlers made their home around present Alma. News travelled fast, and soon other parties of settlers began arriving from eastern Nebraska communities such as Brownville and Nebraska City. Others came from Iowa and Kansas, and even colonies of Danish, Swedish and French immigrants began to settle and establish communities all along the valley. Andreas noted that by June 1, 1871, "there was not a tributary on the Republican on which there were no settlers" (Andreas 1882:959).

After less than a year of active settlement, the pioneers were interested in establishing a separate county government. Before Harlan County was organized, this territory was part of Lincoln County. In a special act by the State Legislature, Harlan County was organized in June 1871 and within a month, county officers and a county seat was established. In a special election held for choosing a county seat, forty-two votes were cast, thirty-seven for Alma and five for a now extinct town named Napoleon (Andreas 1882). Within the next year, many more immigrants moved into the Republican River Valley and two more communities were established: Orleans and Republican City.

Orleans began as a small village in 1872. D.N. Smith, an appointed town site locator for the Burlington and Missouri River Railroad, was interested in the present location of the townsite as a future station along the railroad. After he purchased a claim in the fall of 1872, he quickly laid out and platted a community. Within a year a school, hotel and post office were built. But progress remained slow, as other communities in the immediate vicinity, such as Melrose, became very competitive. It was not until 1876 and the end of county seat troubles did Orleans become a dominant community in the region.

Republican City was established in the spring of 1871 by a party of men from Brownville. Prosperity, however, was slow in coming and the townsite consisted for the first few years of only a couple of stores and a school. Once again, the selection of a county seat helped eliminate other competitors and helped businessmen in Republican City become better established (Andreas 1882).

The selection of Alma as the first county seat did not end the controversy. In June 1872, a petition was gathered and sent to Acting Governor William H. James asking for another election. A new election was granted, and the contestants this time included Alma, Melrose, Republican City and the old townsite of Napoleon. In the election, Melrose won, but the controversy continued. In 1873, District Judge Daniel Gantt ruled the first election the valid one, and the records were removed back to Alma, where they remained. Melrose was soon abandoned and Orleans continued the controversy for several years. A county seat election was held again in 1881 between Orleans and Alma, which only continued the severe factionalism that postponed many county and civic improvements in Harlan County for most of the nineteenth century. This factionalism continues today to some extent.

Harlan County remained a typically agrarian county from its beginnings. The first settlers were either farmers who grew corn or ranchers who raised cattle and hogs. During the first decade, getting their goods to eastern markets proved troublesome. To add to their problems, a grasshopper plague in 1874 and several early blizzards decimated whole herds and wiped out entire fields of corn. Some settlers, in fact, left and did not return.

The coming of the Burlington and Missouri River Railroad up the Republican River Valley in 1879 brought an economic boom to Republican City, Alma and Orleans, as track was built through these towns. All three communities nearly tripled in population and quadrupled in the number of business enterprises in a just a few years (Andreas 1882). Local farms and ranchers were also remedied by having a reliable transportation source for the shipment of their goods. The next few decades proved to be prosperous ones for Harlan County citizens.

Farmers learned to expand their focus from corn to other crops such as wheat, alfalfa and silage. This also improved their condition in the marketplace. The Republican River, however, proved to be a problem on several occasions. Heavy spring rains sent the stream out of its banks, inundating farms, businesses and towns along its valley. While the farm economy witnessed several sporadic rises and dips during the twentieth century, none were quite as severe as the Depression of the 1930's. Compounded by severe drought, many farmers in the Republican River Valley were in desperate need of assistance, and local communites also suffered economic depressions due to the farmers' plight.

The darkest hour occurred in 1935 when a disastrous flood took the lives of 110 people and caused over nine million dollars in property damage in the Republican River Valley (Dept. of Interior 1981). As a result, local residents took a number of actions toward developing, controlling and improving their land and water resources.

An organization of concerned citizens requested the assistance of the Federal Government. Comprehensive studies and surveys were conducted by the Departments of the Interior, Agriculture and War. As a result of the findings of these studies, construction of the Bostwick Division was authorized by Congress in 1944 and work began in 1948. Construction of the Harlan County Dam and Lake was just one part of this project to provide effective flood control relief to the valley below the dam. On December 9, 1952, the dam was completed and operational.

Since its construction, the advantages of the dam to drought on irrigated land has been virtually eliminated and agricultural production has been stabilized. The farming community today is more assured of a dependable income from a previously unstable source, therefore also benefitting the local economy in the nearby towns of Alma, Republican City and Orleans. It also provides excellent facilities for outdoor recreational activities. Thousands of people visit the dam annually; many live near its shores. The tourists bring with them extra dollars for the local economy. Popular recreational activities include camping, fishing, swimming, boating and water skiiing. Therefore, the overall economic conditions of Harlan County have been improved by the construction of the Harlan County Lake.

Chapter 6

Archaeological Field and Laboratory Methods

Mary J. Adair
Kenneth L. Brown

Introduction

Procedures for data recovery were in two forms: (1) extensive and intensive literature and records searches by the archaeologists and historian for results of investigations made by previous researchers and (2) archaeological field and laboratory procedures for obtaining maximum information during test excavations and artifact analyses. Research began with a detailed Research Design for all phases of project investigations. This was submitted to, and approved by, the Kansas City District, U. S. Army Corps of Engineers prior to initiation of field investigations. All phases of research was conducted by an interdisciplinary team consisting of archaeologists with expertise in specialized studies (i.e., lithics, ceramics, botanical, faunal, etc.), a paleontologist, a geomorphologist and a historian. Field investigations were performed during the months of July and August, 1985. The time of the field investigations was advantageous since the water level of Harlan County Lake was relatively low, exposing shorelines where sites were reported to exist. It was, however, disadvantageous because of the dry, hard soils that were not conducive to extensive hand augering.

Initial Investigations

Initial investigations began with a preliminary literature and records search of investigations in the Harlan County Lake area made by previous researchers. This provided background information regarding the 28 sites to be tested for significance and potential eligibility for nomination to the National Register of Historic Places. The preliminary literature and records search also provided some information that was field-checked and which, as it turned out, was misinformation. This misinformation concerned the reported occurrence of sites being located on the beach when in fact they are located on higher terraces that are eroding onto the beach (e.g., Roetzel et al. 1982).

Procedures for Field Investigations

Archaeological field procedures varied for each site investigated, but several field procedures that were uniform for all sites investigated include the following. First, a permanent datum was established at each site. The datums, consisting of five foot long 1.5 inch diameter white plastic

PVC pipe, were set into the ground in a vertical position leaving one to two feet of pipe exposed above ground. These datums were the points where all transit, mapping and excavation coordinates originated. A transit was used to establish placement of all test excavations. True north was used at all sites. A laser transit and prism were used to collect data that was used to make all site maps and to tie site datums, when possible, into more permanent Corps and Land Survey markers (e.g., brass caps set in cement). Site boundaries were determined partially by the surface scatter of artifacutal material. Sites were traversed along transects by pedestrian reconnaissance. The surface scatter of cultural material was noted. For buried sites, examination of erosional banks, backhoe trenches and test pits helped delineate site boundaries.

With the exception of the Cove site, 25HN164, and Buffalo Bill's Cave, investigations consisted of two forms: (1) manual excavation of 1 X 1 meter test pits in arbitrary placement on each site and (2) backhoe trenches measuring 24 inches wide and at sufficient depth to determine the presence of deeply buried cultural deposits at selected sites. Backhoe trenches were dug at sites that were situated on alluvial and loess soils that were most likely to have deeply buried cultural remains. In addition, selected sites with extensive, natural occurring cutbanks did not have backhoe trenches dug, but rather portions of the cutbanks were cleaned and carefully examined for deeply buried cultural remains. As suggested in the Research Design (Adair and Brown 1985:2.2), auger holes placed over each site at intervals no greater than 20 meters was not conducted due to the extremely dry and hard soil conditions. Rather, intensive examination of surface remains and placement of 1 X 1 meter test pits over the sites were conducted to determine spatial extent of cultural remains.

Test pits were dug in arbitrary levels that consisted of one or more of the following: (1) plow zone (of variable depth); (2) 10 cm levels, and (3) 20 cm levels. Test pits were dug to sufficient depth to determine the extent of cultural remains. Manual excavations consisted of a combination of shovel skimming and troweling. Artifacts were bagged according to excavation unit and level. After completion of each excavation level within each 1 X 1 meter test pit, an excavation level form was completed. Excavation level forms described the contents of each excavation level. All soils were dry sifted through one-fourth inch hardware cloth. Soil samples were taken from arbitrary levels for water flotation and screening in the laboratory to recover macrobotanical and macrofaunal remains. Profiles were drawn and photographs were taken of representative walls of test pits. Segments of some of the backhoe trenches were also profiled and photographed. As according to the Scope of Work and Research Design, test excavations did not total more than 16 square meters at any one site.

Features, consisting of a baking pit and trash filled storage pits, were excavated separately from the surrounding soils. All soils within features were saved for water flotation in the laboratory. Representative soil samples from feature fill were saved for opal phytolith analyses. Excavation of features consisted of first exposing the entire surface or top. Photographs were taken and sketch maps were drawn. They were then cross-sectioned, using a trowel for excavation. Additional photographs were taken and profiles were drawn. Finally, the rest of the feature was excavated with a trowel and final photographs were taken and sketch maps were drawn. Both black-and-white photographs and color slides were taken of features. Artifacts recovered from within the contents of the feature were bagged according to the feature number rather than the excavation unit and level. In conjunction with the sketch maps, a feature form describing the feature and its contents was completed.

A subsurface investigation of the Cove site, 25HN164, was completed by using a truck-mounted drill rig that primarily obtained auger samples although the drill rig was capable of pushing 3-inch Shelby tubes. Borings were systematically placed over what was believed to be the site area in order to determine the nature of deeply buried soils, fauna and flora. Because Late Pleistocene fauna and flora were buried to a depth of greater than five meters, 1 X 1 meter test pits and tractor-mounted backhoe were not feasible investigation procedures. Rather, several segments of the cutbank were cleaned and profiled. Soil samples were taken from selected soils for flotation to recover macrobotanical and macrofaunal remains. Soil samples were also taken for pollen and opal phytolith analyses.

Buffalo Bill's Cave was investigated with the aid of a White's metal detector. The entire area within and adjacent to the rock shelter was inspected with the metal detector. All metal objects detected were inspected for determination of a mid-nineteenth century occupation.

Specific field investigations conducted at individual sites are discussed with each site description in Chapter 7. Because of various site preservation, size and depth, specific field methods varied according to the requirements of each site.

Laboratory Analyses

All artifacts were bagged and bags were labeled in the field as the artifacts were recovered. The artifacts were returned to the laboratory on an irregular basis during the course of the field work. Washing, sorting and preliminary cataloging of artifacts were done by a full-time laboratory director during the course of the field work. Artifacts were assigned catalogue numbers after they were sorted and during analyses. Initial analysis began with sorting the artifacts into broad categories according to type (i.e., lithics, pottery, faunal, botanical, etc.).

Lithics include all complete and fragmented stone artifacts. These include, but are not limited to, flakes, shatter/chunks, cores, scrapers, drills, knives, projectile points, abraders and unmodified stone. Attributes recorded for each artifact include length, width, thickness, weight, tool type, tool condition, presence of cortex, presence of heat treating, type of raw material, retouched edge angles and description of discernible wear along the working edges. General summaries of the frequencies of the above attributes for specific sites were tabulated (see Chapter 8).

Ceramics include all fired clay materials except for burned earth. Attributes recorded for pottery sherds large enough for measurements include type of temper, color, surface treatment, finishing technique, presence of a carbon streak, placement or orientation of cordmarking, cord width, cord twist and sherd thickness. Attributes recorded for rim sherds also include lip thickness, rim thickness, rim height and when possible, orifice diameter. General summaries of the frequencies of the above attributes for specific sites were tabulated (see Chapter 9).

Faunal remains include all animal bones, antler, teeth and mussel shell. Each faunal element was identified, when possible, to the lowest possible taxon. Each bone was examined for the presence of discernible butchering marks and/or use as a tool. Worked bone are described individually. The calculation of minimum numbers of individuals based on the frequency of diagnostic elements is made. Taken into consideration in determining minimum numbers of individuals is element, side, size, and age when possible. A determination of the relative importance of identified animal species to the diet of the peoples at specific sites is made. A calculation of resource zone(s) most frequently exploited for the procurement of animal species at each site is presented. These findings are compared with previously excavated sites and applicable ethnohistorical data (see Chapter 10).

Botanical remains include floral elements visible to the unaided eye but usually identified with the use of a binocular microscope. Remains include charred seeds, nutshells, charcoal and what Asch and Asch (1980) refer to as spherical objects. Most botanical remains were recovered from soil flotation procedures. Because of the low frequency of recovered botanical remains, all specimens were examined for identification. Specimens were identified to the lowest possible taxon. Very few cultigens were identified in any of the samples. A determination of the relative importance of identified botanical species to the diet of the peoples at specific sites is provided. A calculation of resource zone(s) most frequently exploited for the procurement of botanical species present at each is presented. These findings are compared with previously excavated sites and applicable ethnohistorical data (see Chapter 10).

Specialized data are data not always recovered from archaeological deposits, such as daub, pollen and opal phytoliths. In the present study no daub was recovered. Pollen and opal phytolith analyses are often not standard methods in Plains archaeology, primarily due to the poor preservation of pollen in open air sites. In the present study opal phytolith analyses were conducted of soil samples from all (a total of four) excavated features. These analyses were done to determine the presence of cultigens at the sites that had intact features. Unfortunately, results of the opal phytolith analyses were negative (see Chapter 10). Also, because all of the sites, with the exception of the Cove site (25HN164), were near or on the ground surface, pollen analyses of soil samples taken at these sites would not have been productive. In contrast, extensive pollen analyses were conducted for deeply buried deposits at the Cove site (25HN164) (see Chapter 7.2).

Radiocarbon dating of charcoal recovered from excavations and humic matter within buried paleosols were obtained. Because of large samples from several sites, two or more radiocarbon dates were obtained from three different laboratories. The radiocarbon laboratories include Geochron at the Center for Isotope Studies at the University of Georgia, Dicarb at the University of Oklahoma, and Beta Analytic. Obtaining more than one date and using different laboratories provided a little more control over deviations that occur in the radiocarbon dating method (see site descriptions, Chapter 7.1).

Analyses of historical artifacts are similar to that for prehistoric artifacts. Historic artifacts were sorted according to specific types (i.e., nails, window glass, bottle glass, miscellaneous metal, etc.) and are described individually because of their low frequency. Nails were identified, when possible, to penny weight and type (i.e., square hand made, square machine cut, wire, roofing, finishing, etc.). The depth of occurrence of historic artifacts provided useful information regarding the amount of historical disturbance of prehistoric cultural deposits at some sites. This information proved valuable for determining potential significance and making recommendations regarding potential eligibility for nomination to the National Register of Historic Places.

Chapter 7.1

Site Descriptions and Recovered Artifacts

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Introduction

This chapter describes each site, its physical location in the environment, previous investigations, investigations conducted during the summer of 1985, artifacts recovered and recommendations regarding potential significance. The purpose of this chapter is to provide information known about each individual site and not a synthesis of the data. Results of data analyses and syntheses are presented in Chapters 8, 9, 10 and 11. Site numbering is the Smithsonian Institution trinomial system that includes a number designating the state of Nebraska (i.e., 25), two letters designating the county (e.g., HN) and a number designating the sequential numbering of sites within the county. Catalog numbers used in this study (e.g., HN40850000) include a four-part designation. The first part, HN, refers to Harlan County. The second part, 40, refers to the site number. The third part, 85, refers to the year field work was conducted and part four is a sequential number for artifacts from a single site.

Figure 14 shows Corps property within the Harlan County Lake Project. Each site description has a map showing the elevation contours in meters above mean sea level and placement of site datums, test units, and trenches. Site limits were determined on the basis of surface scatter of cultural materials, examination of cut banks, backhoe trenches, and test pits. Sites located in cultivated fields were delineated primarily by surface scatter of cultural materials. Test pits were arbitrarily located where there appeared to be minimal site disturbance due to modern agricultural practices, construction, and erosion. Test pits were manually excavated to sufficient depth to determine the maximum depth of in situ cultural remains. Because of extensive rodent disturbances, cultural sterile levels were not always dug because of vertical transport of a few artifacts by the rodents. Maximum depths of the test pits were determined by the frequency of cultural remains being recovered. The length of backhoe trenches was determined by the discretion of the geomorphologist. Trench profiles were drawn at representative sections of the trench.

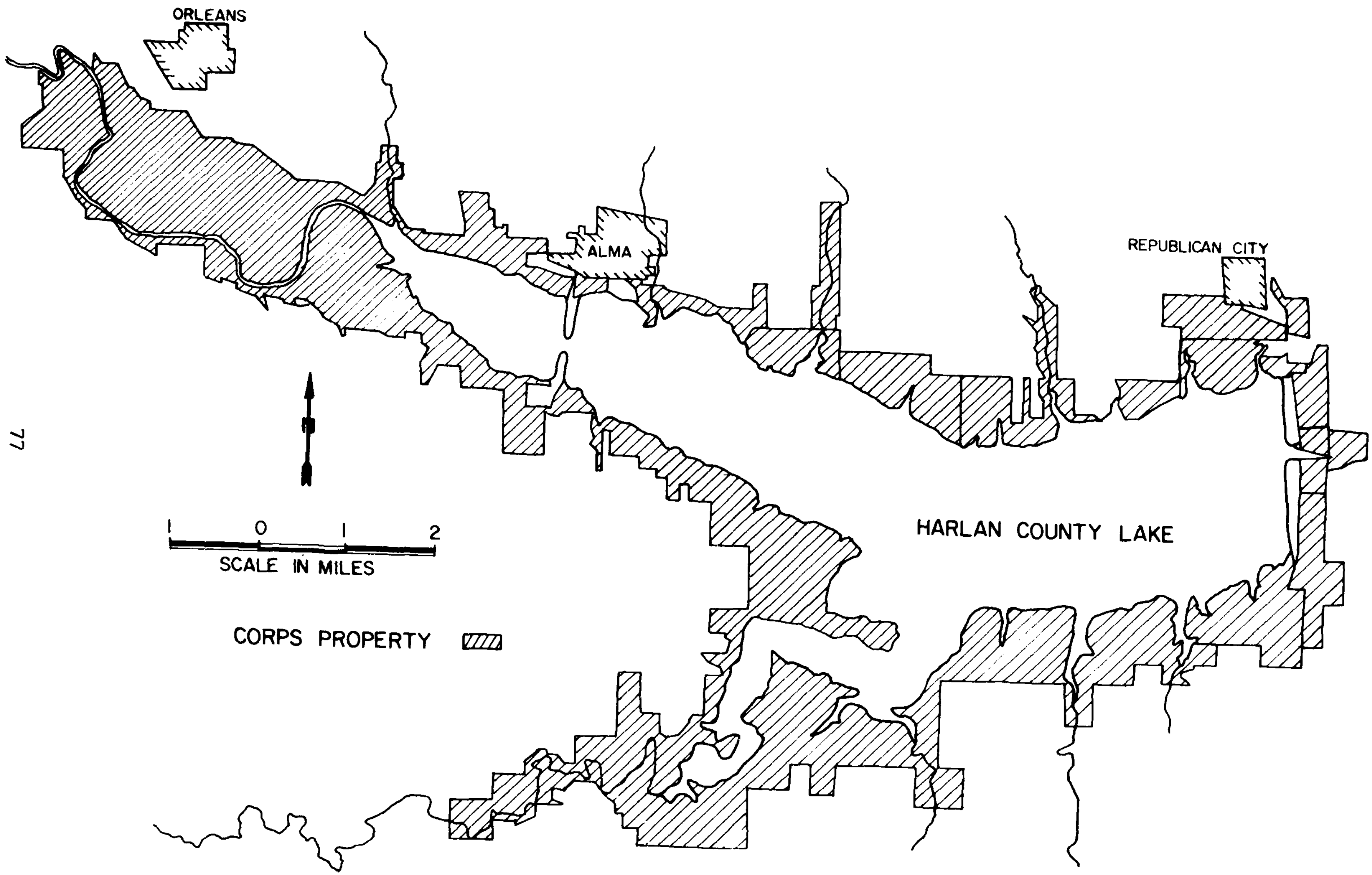


Figure 14. Boundaries of Corps Property.

25HN5

Figures	15 through 18
Plate	1
Site Type	Ossuary
Recorded	1930, Nebraska State Archeological Survey
Size	1,500 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Hill top
Name	Graham Ossuary
Drainage	Prairie Dog Creek
Surface Visibility	50 percent

Previous Research

The first professional investigations at this site were conducted during the summer of 1930 by the Nebraska Archeological Survey. Mention is made by Strong (1935:103) however, to previous excavations at the site by C.B. Schultz of Red Cloud, Nebraska, and to unidentified amateurs or looters. Its prominent position on the summit of a hill provides for an excellent and striking view of the Republican River Valley, both today and 50 years ago. Its location, however, has also helped make it an easy target for vandalism.

In 1930, excavations defined the extent of the site within a 24 X 23 foot area and extending to a depth of 3.5 feet (1.3 meters). Below previously disturbed areas, the researchers uncovered a "... mixture of broken and scattered human bones, broken pottery, stones, charcoal, and cultural debris" (Kivett 1947b:3). Stylistic designs on the ceramics indicated an Upper Republican cultural affiliation. The original manner in which the deceased were placed into the ossuary remains problematic. Strong suggests (1935:105) that the human remains had been deposited in the pit over a considerable period of time after they had been exposed to the elements and completely defleshed. Some remains are slightly scorched or charred, although this does not appear to have been an in situ practice. Associated artifacts may have been grave offerings and the numerous stones may have originally outlined a crude "grave". No complete skeletons were uncovered; remains of two infants and at least eight adults were identified in 1930. These remains have never been studied and until 1985, no additional subsurface investigations were conducted at the site by professional archaeologists.

1985 Investigations

Investigations included excavation of three 1 X 2 meter pits and one 1 X 3 meter pit (Figs. 15 through 18). A site datum was established adjacent to the Corps of Engineers triangulation station No. R15 (i.e., brass marker) that is located at the center of the site. The Corps marker was used for all site mapping. The site datum was placed adjacent to the brass marker as specified in the Research Design (Adair and Brown 1985). Table 5 summarizes the test units that were manually excavated. Although units 1 through 4 were at the west edge of the site and contain few artifacts, units 5, 6 and 9 were near the center of the site and cultural material continued to a depth of approximately 50 cm below surface. Based on the non-mottled soils, and examination of Strong's (1935) map of his excavations, this area of the site did not appear to have been previously excavated. Units 7 and 8 were dug to a depth of 100 cm and 140 cm, respectively. Artifacts, which include shell beads and pendants and bone beads (Table 7 and Plate 1), occurred to a depth of 140 cm and 10 grams of mussel shells were also recovered. Examination of the profile for these units (Fig. 17) indicates this area had been previously excavated and backfilled. This portion of the site had been excavated by Strong in 1930 (Strong 1935, n.d.). The presence of mainly small human bones (e.g., phalanges, teeth, carpals) (Table 7 and Plate 1) and worked shell attests to the non-screening of soils by previous investigators.

A total of 1,756 human remains (i.e., bone fragments and teeth) were recovered mainly from units 7 and 8. Of these, it was possible to identify 410 specimens (23.3 percent of the total human osteological assemblage) as to element. There is a puacity of long bones in the assemblage, most having been previously recovered by Strong (1935). The majority of the assemblage consists of skull fragments, teeth and rib and vertebra fragments. Hand and foot bones are also present. Examination of the identifiable elements discerned the presence of at least 17 individuals: two fetuses, three infants, three children, two adolescents and seven adults, including one aged individual. Based on this information, it is expected that remains of many more individuals are still contained within the ossuary pit.

The occurrence of a few cultural remains from units 1 through 4 and a larger quantity from units 5, 6 and 9 in areas not previously excavated by earlier researchers indicates substantial cultural remains are present at the site. The observation of a few flakes in the road cut that borders the east edge of the site also indicates the site extends eastward to the road. Examination of the road cut on the east side of the road did not reveal any cultural materials. Table 6 lists the stone tools and other items (e.g., charcoal, sandstone, limestone) recovered from test excavations. The large number of shell beads (Table 7 and

Table 5

25HN5
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm	3			4		
10-20 cm						
Unit 2						
0-10 cm	1			1		
10-20 cm						
Unit 3						
0-10 cm	2			1		
10-20 cm						
20-30 cm				1		
Unit 4						
0-10 cm	4				2	
10-20 cm						
20-30 cm						
Unit 5						
0-10 cm						
10-20 cm	3			1	5	
20-30 cm				1	6	
30-40 cm	1			1	2	
40-50 cm	1					
Unit 6						
0-10 cm	7			5	14	
10-20 cm	12			3	40	
20-30 cm	4			1	11	
30-40 cm					5	
40-50 cm					1	
Unit 7						
0-10 cm	4			3	23	
10-20 cm	2		1	8	19	1
20-30 cm	7			2	24	
30-40 cm	5			4	23	
40-60 cm	6	1		1	24	3
60-70 cm	1			3	14	
70-80 cm	1			3	5	
80-90 cm	2			3	13	
90-100 cm	1			1	6	

Table 5 cont.

<u>Unit 8</u>						
0-10 cm	5				13	
10-20 cm	4	1		10	18	
20-30 cm	6			5	19	2
30-40 cm	6			7	17	
40-60 cm	5			2	24	3
60-70 cm	2			1	10	1
70-80 cm	3			3	18	
80-90 cm	1			3	13	
90-100 cm	3			3	17	
100-120 cm	8			1	16	
120-140 cm	1			1	9	
<u>Unit 9</u>						
0-10 cm	15			7	49	1
10-20 cm	16				36	
20-30 cm	3			2	48	1
30-40 cm	1				3	
40-50 cm	2				3	
Totals	148	2	1	92	553	10
Surface	1					

Table 6

25HN5 Tools

artifact	unit/level	description
projectile point	6 /10-20 cm	small triangular shaped, biface, side notched, tip missing
point/knife	7 /10-20 cm	triangular shaped biface, tip and base missing
biface resharpening flake	7 /30-40 cm	complete
retouched flakes	8 /100-120 cm	
(2)	9 /10-20 cm	
abrader	8 /40-60 cm	sandstone fragment, sub-rectangular shaped
glass	8 /120-140 cm	historic white glassware
yellow ochre		0.6 grams total
charcoal		0.1 grams total
sandstone		12.0 grams total
limestone		2.9 grams total

Table 7

25HN5 Shell and Bone Beads

catalog number	(mm) outside diameter	* hole: BI/UNI	(mm) hole diameter	(mm) thickness	(mm) width
		SHELL BEADS			
25HN585863 (Plate 1 j)	11.5	B	4.1	4.2	
25HN585864 (Plate 1 i)	7.8	B	2.9	5.2	
25HN585865 (Plate 1 h)	7.3	B	3.3	3.4	
25HN585424	8.6	U	3.1	2.4	
25HN585436	7.8	B	3.3	4.1	
25HN585428	9.1	B	4.0	2.6	
25HN585429	10.0	U	3.0	3.6	
25HN585430	9.3	B	3.2	2.9	
25HN585431	9.5	B	3.7	3.0	
25HN585432	9.5	B	3.3	3.7	
25HN585423	9.1	B	3.3	2.9	
25HN585433	10.6	B	3.4	2.0	
25HN585434	11.7	eroded	3.7	2.3	
25HN585435	7.3	B	3.1	3.4	
25HN585425	8.7	B	3.4	2.5	
25HN585426	12.8	B	2.6	3.9	
25HN585427	12.9	B	2.8	4.0	
25HN585439	8.3	U	2.8	4.3	
25HN585440	8.9	B	3.1	3.5	
25HN585441	9.8	B	3.2	2.3	
25HN585442	7.9	B	3.8	2.2	
		TUBULAR BONE BEADS			
25HN585866 groove and snap (broken) (Plate 1 e)	21.1+	-	5.2	7.8	
25HN585437 groove and snap (Plate 1 f)	26.3	-	3.9	5.6	
		SHELL PENDANTS			
25HN585438 (Plate 1 k)	26.6	B	1.9	2.5	8.5
25HN585443 (Plate 1 c)	36.4+	B	(broken)	1.7	6.8

* BI: bi-directionally drilled hole
UNI: uni-directionally drilled hole

Plate 1) and human remains recovered in 1985, in addition to materials recovered by Strong (Strong 1935, n.d.), indicates this is a significant site in regard to understanding the burial customs of Upper Republican peoples. The occurrence of stone tools (Table 6) suggests other activities were performed at the site in addition to the interment of human remains.

Interpretations

Graham Ossuary represents a community burial area that is assigned to the Upper Republican complex. Burials appear to have been secondary interments that may have originally been placed on scaffolds elsewhere prior to interment at the ossuary. The ossuary appears to have consisted of one large burial pit with several smaller pits on the peripheral edges. A large number of burial goods (e.g., shell beads and pendants, bone beads and bracelets, copper ornaments, pottery, stone tools) are associated with the human remains. The quantity, minimum number of individuals (MNI=17) and age structure represented at the ossuary, based on the 1985 investigations, indicate little social stratification within Upper Republican society. The frequent occurrence of fetal/infant remains (MNI=5) suggests a relatively high infant mortality rate for Upper Republican peoples.

Recommendations

Based on the amount of cultural remains (e.g., shell beads and pendants and bone beads) recovered in 1985 and the presence of unexcavated portions of the site remaining, it is recommended that Graham Ossuary be considered eligible for nomination to the National Register of Historic Places. Due to vandalism at the site, as evidenced by shallow pot holes, it is recommended that additional soil be placed over the site and chain-linked fencing be constructed around the site to discourage vandalism. Because the site contains the remains of human burials it is imperative that the site be given the respect that any place of human interment deserves.

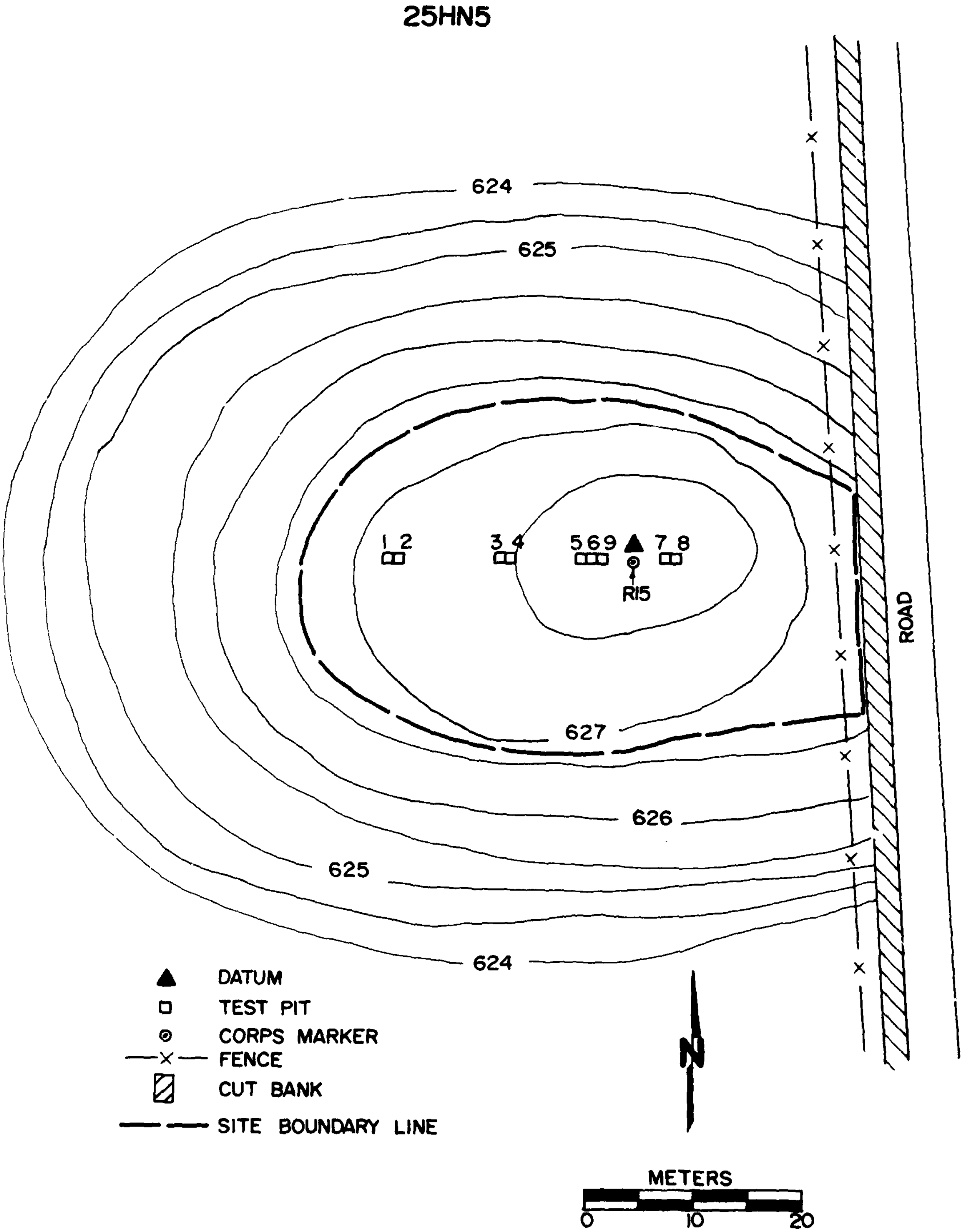


Figure 15. Site map of Graham Ossuary, 25HN5.

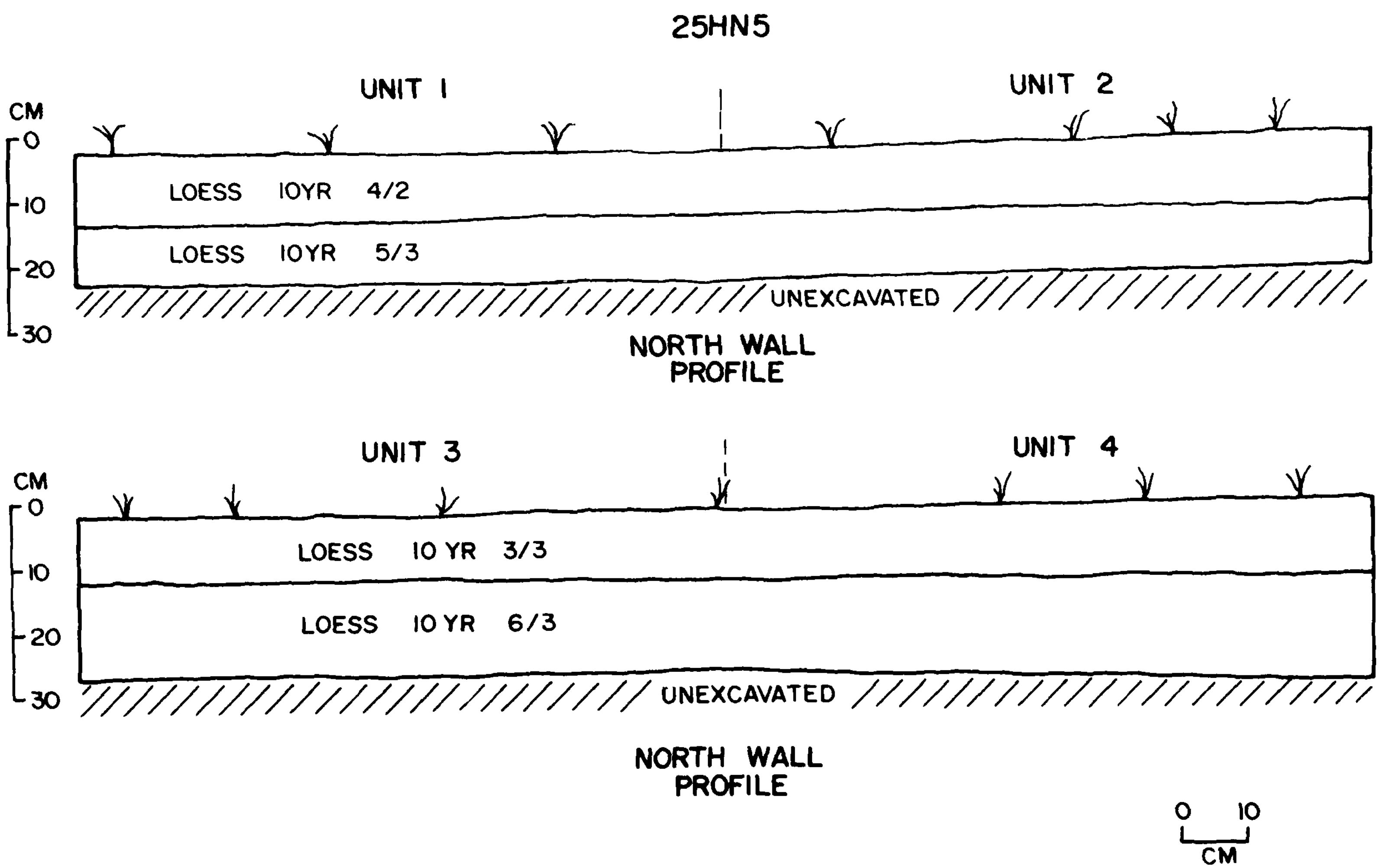


Figure 16. Profile of units 1, 2, 3, and 4 at site 25HN5.

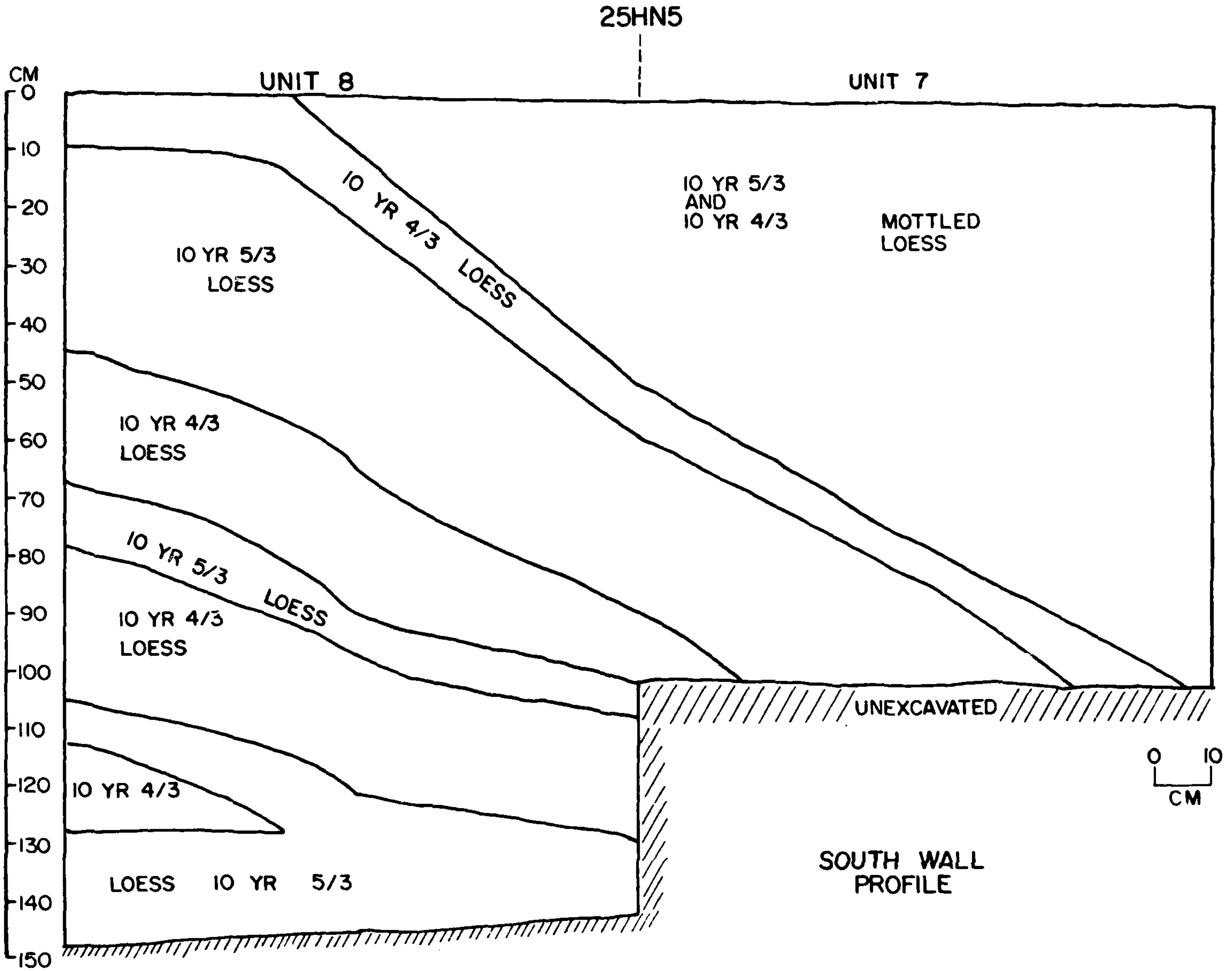


Figure 17. Profile of units 7 and 8 at site 25HN5.

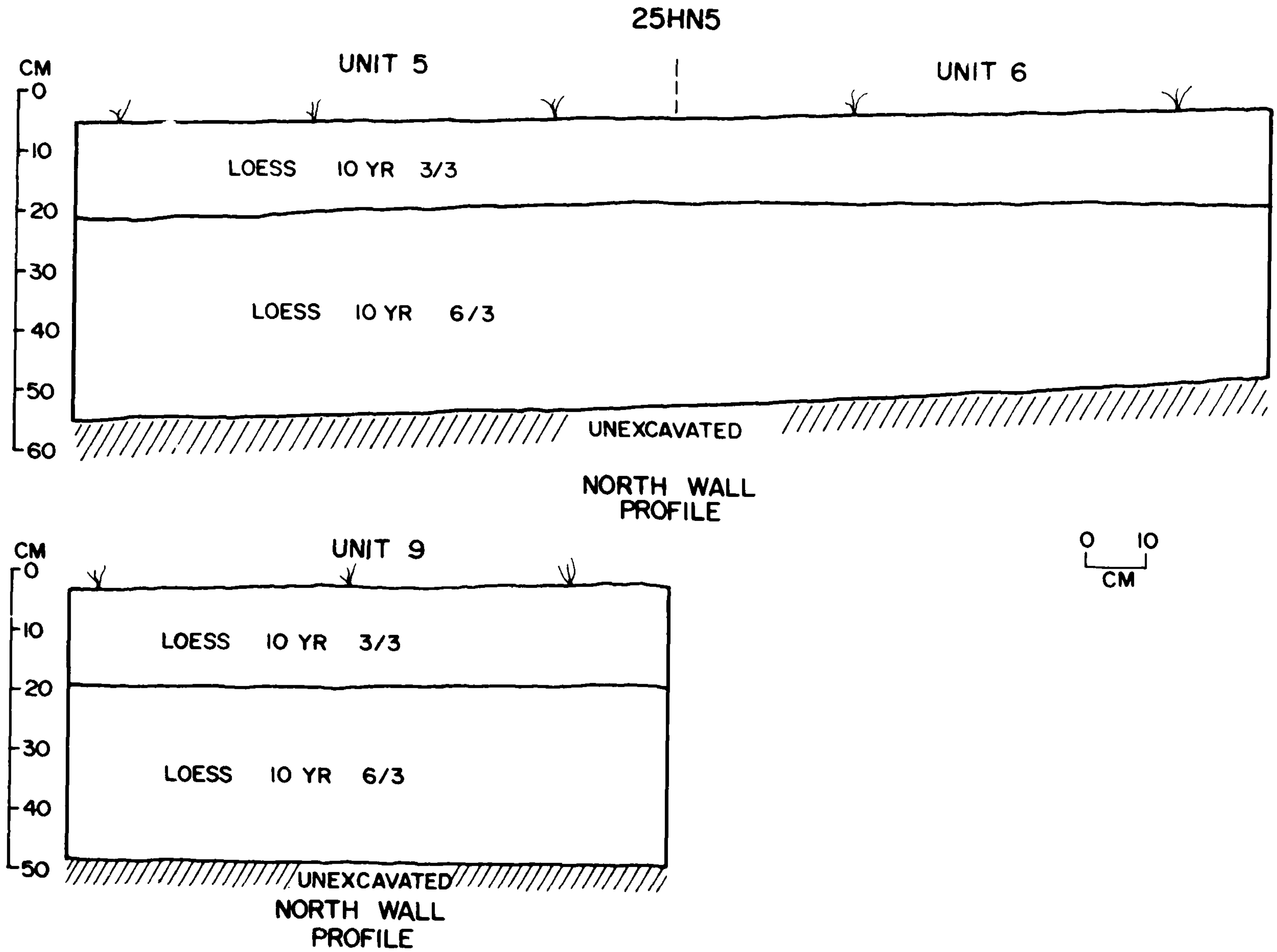


Figure 18. Profile of units 5, 6, and 9 at site 25HN5.

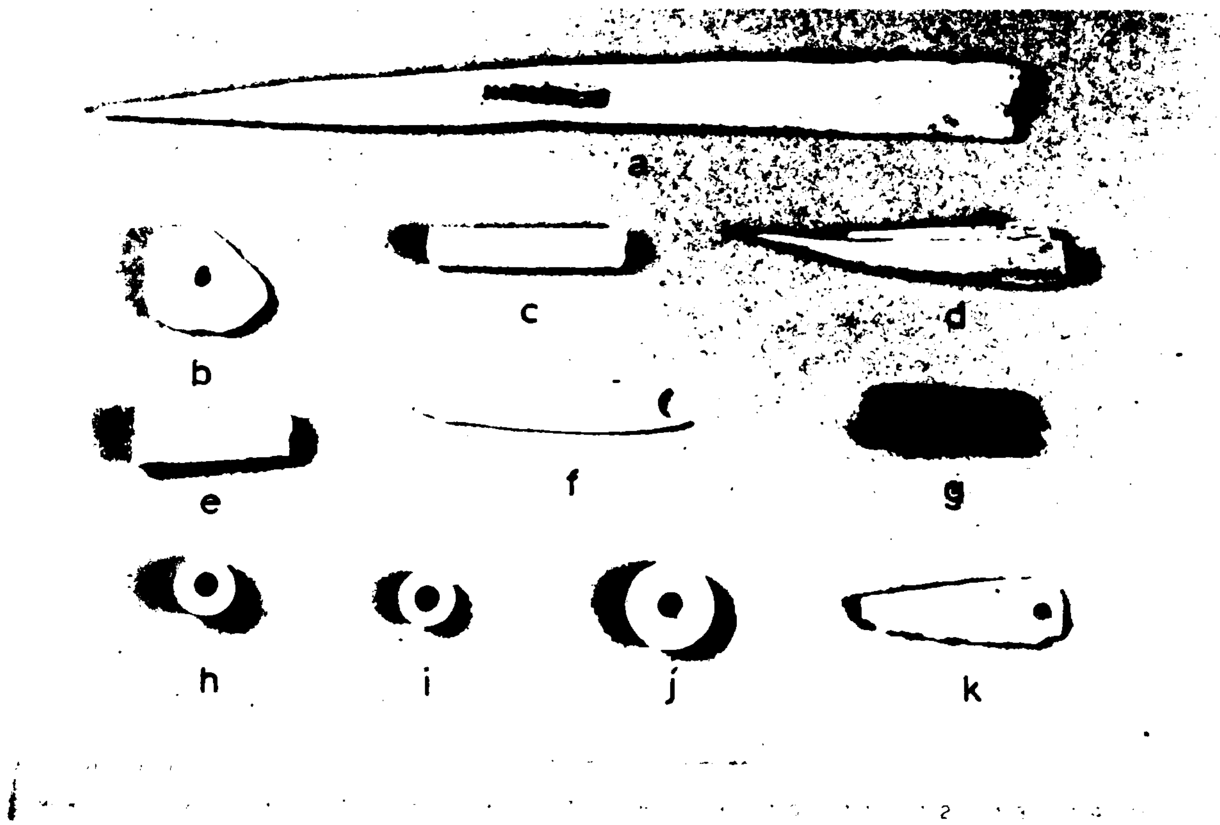


Plate 1. Bone and shell artifacts from sites 25HN36, 25HN40, and 25HN5: a) 25HN3685278; b) 25HN4085028; c) 25HN585443; d) 25HN3685977; e) 25HN585866; f) 25HN585437; g) 25HN36851171; h) 25HN585865; i) 25HN585864; j) 25HN585863; k) 25HN585438.

25HN6

Figures	19 through 21
Site Type	Lithic scatter
Recorded	1928, Bertrand Schultz
Size	1,600 square meters
Cultural Affiliation	Unknown
Topographic Setting	Ridge top
Name	Unnamed
Drainage	Bone Creek
Surface Visibility	50 percent

Previous Research

This site was recorded in 1928 by Bertrand Schultz of Red Cloud, Nebraska and has remained relatively unknown. In 1978 the site was described as primarily a lithic scatter, dispersed intermittently over an area of approximately 400 X 400 meters (Pepperl and Falk 1978:6). It is located along a ridge and dissected slope area west of Bone Cove shoreline. Cultural affiliation could not be determined from the artifacts recovered from the site.

1985 Investigations

Investigations included manual excavation of two 1 X 2 meter pits and excavation of a backhoe trench across the site (Figs. 19 through 21). Manual excavations were conducted in arbitrary 10 cm levels to a depth of 40 cm in units 1, 2 and 3. Unit 4 was dug to a depth of 30 cm (Table 8). The soils are loess with discernible A and B horizons. Cultural remains were found only in the top 20 cm in units 1 and 2. Chipped stone debris occurred in low frequency thoughout units 3 and 4 (Table 8). There has been much small mammal disturbance of the site in the form of burrows and dens. Based on the test pits, cultural remains are believed to occur within the uppermost 20 cm in undisturbed portions of the site. The backhoe trench, which was dug to a depth of 160 cm (Fig. 21), did not reveal any evidence of buried cultural remains or occupations.

Interpretations

Site 25HN6 appears to have been used as a hunting and gathering camp that had an excellent view of the Republican River Valley. The small quantity of lithics and their occurrence near the surface suggests a temporary, possibly repeated, occupation of the site.

Recommendations

Because of the low quantity of artifacts present, total absence of diagnostic materials and datable features, site 25HN6 is not recommended for being considered potentially eligible for nomination to the National Register of Historic Places.

Table 8

25HN6
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm	1			1		
10-20 cm	4			1		
20-30 cm						
30-40 cm						
Unit 2						
0-10 cm						
10-20 cm	4					
20-30 cm						
30-40 cm						
Unit 3						
0-10 cm	5					
10-20 cm	2			1		
20-30 cm	2					
30-40 cm	2	1				
Unit 4						
0-10 cm	5			2		
10-20 cm	3					
20-30 cm	2	1				
Totals	30	2		5		
Surface	3			10		

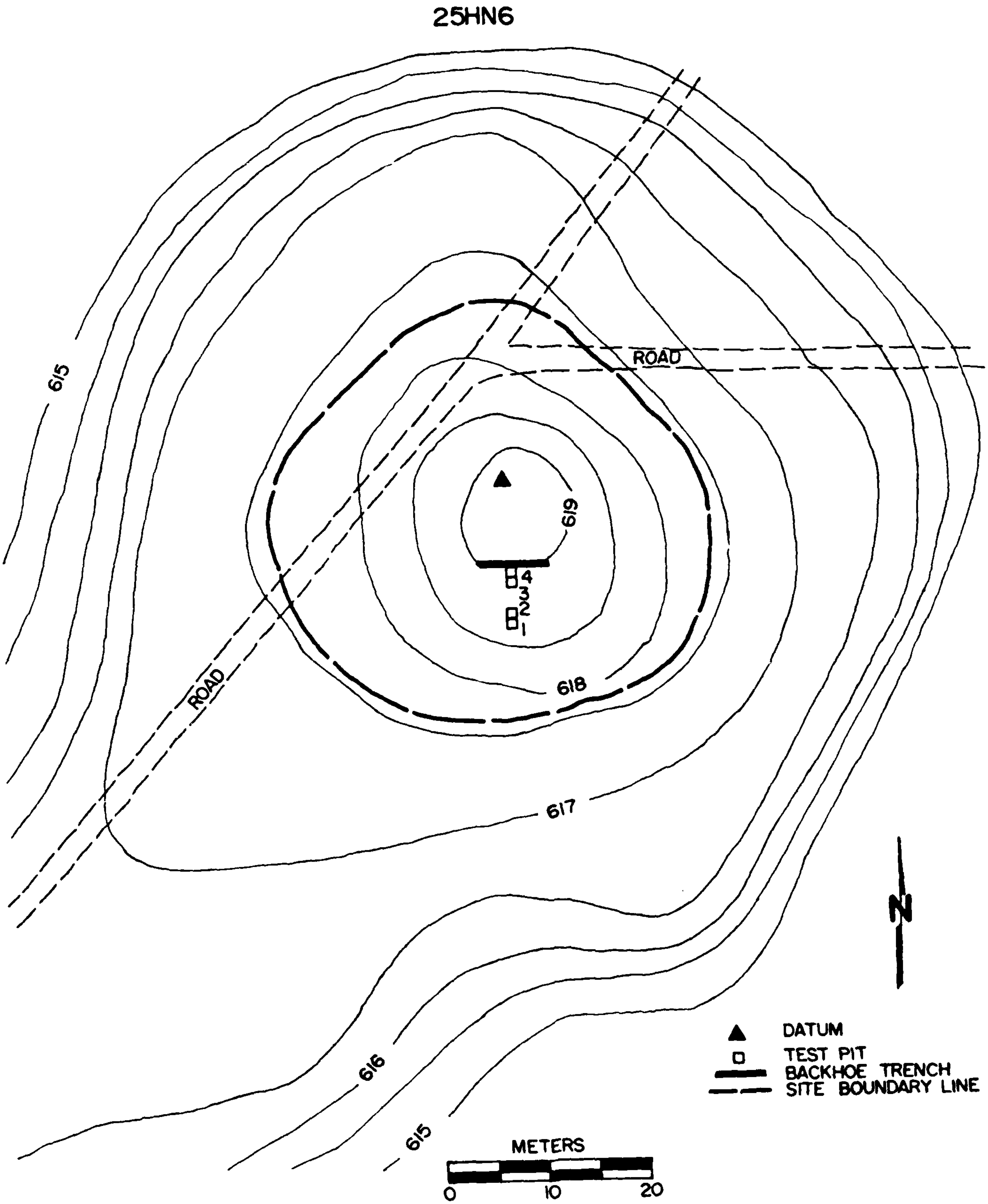


Figure 19. Site map of 25HN6.

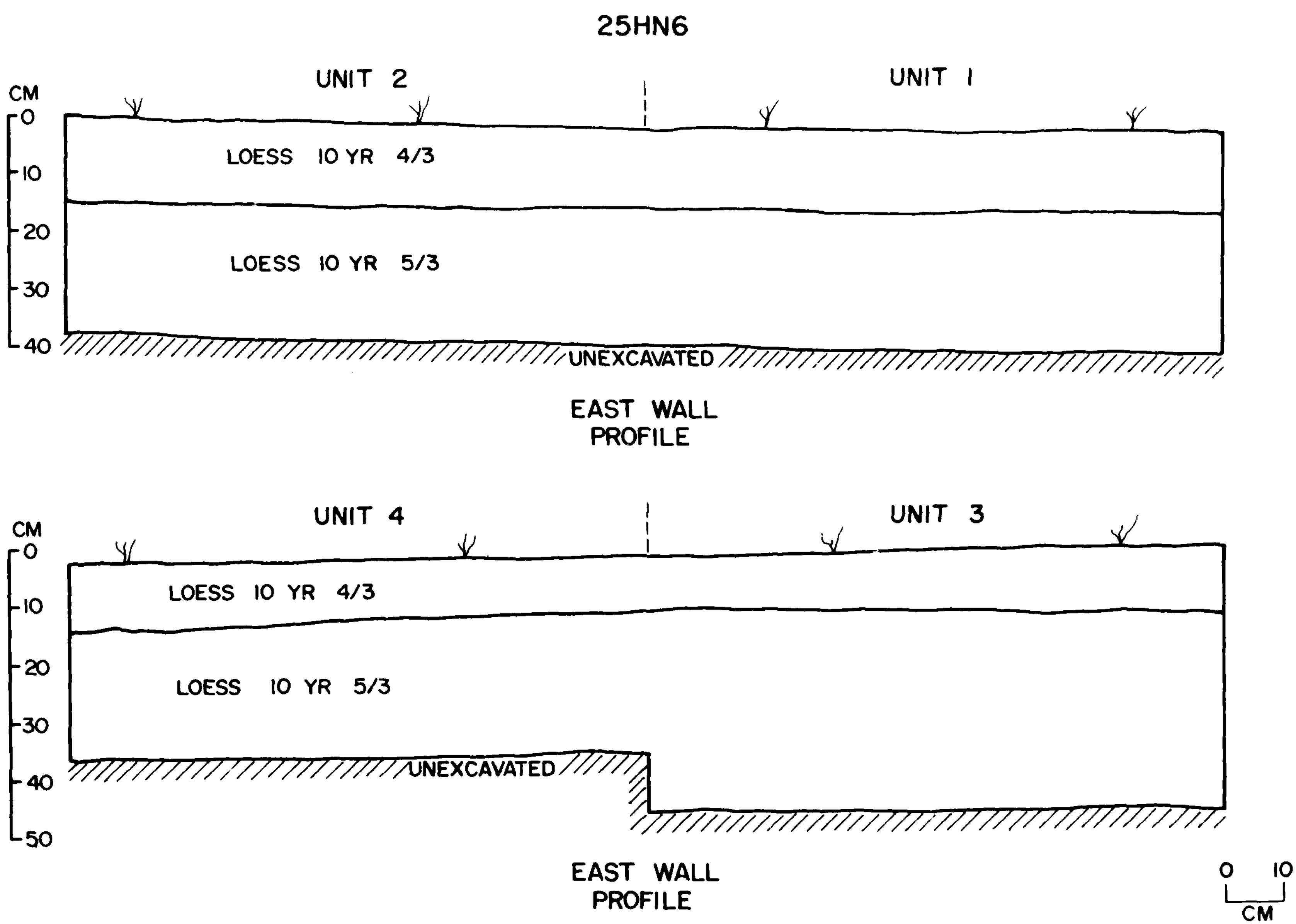


Figure 20. Profile of units 1, 2, 3, and 4 at 25HN6.

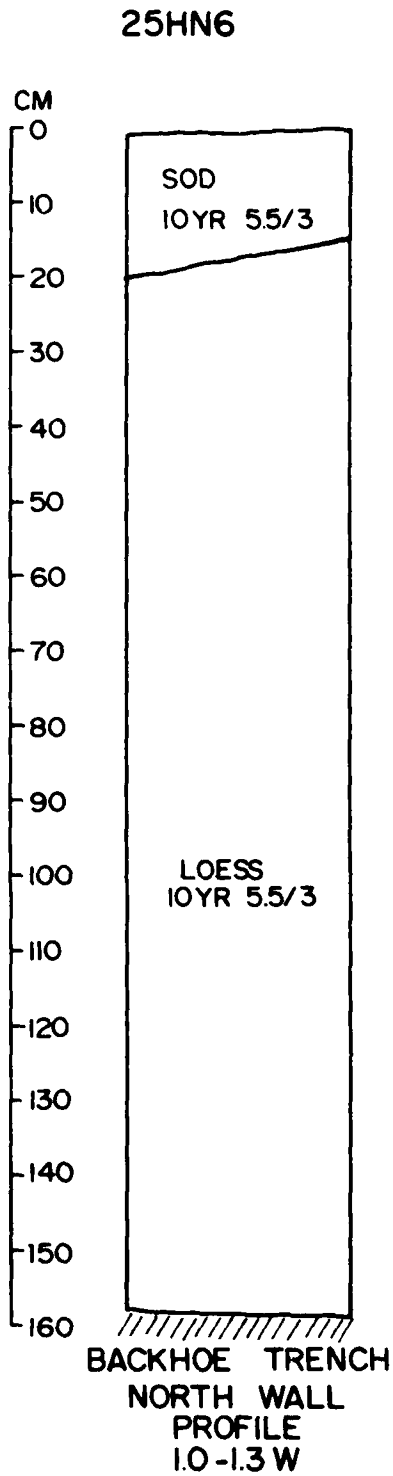


Figure 21. Profile of backhoe trench at site 25HN6.

25HN12

Figures	22 through 25
Plate	2
Site Type	Habitation
Recorded	1949, University of Nebraska
Size	3,000 square meters
Cultural Affiliation	Keith, Upper Republican*
Topographic Setting	Terrace
Name	Unnamed
Drainage	Prairie Dog Creek
Surface Visibility	50 to 75 percent

Previous Research

First recorded in 1949 by the University of Nebraska, Lincoln, the site is described as occupying a low terrace south of Prairie Dog Creek (Fig. 22). A series of surface collections and the excavation of six test units in 1950 led to the division of the site into two areas. According to the notes on file at the Department of Anthropology, University of Nebraska, Lincoln, Area 1 was restricted to the west part of the terrace where surface materials covered an area of about 45 meters north-south and 40 meters east-west. Calcite tempered cordmarked ceramics indicated a Woodland period association. Area 2 contained a surface concentration of material identified as Upper Republican and was located on the eastern portion of the terrace, about 100 meters from Area 1. Various artifacts were recovered by these test excavations, including several projectile point fragments, drills, scrapers, flakes, grooved abraders, over 70 ceramic sherds, and unidentified shell and bone fragments.

1985 Investigations

Investigations consisted of manual excavation of three 1 X 2 meter pits and excavation of a backhoe trench through the terrace on which the site occurs (Figs. 22 and 23). The plow zone varies in depth from 15 to 40 cm. In test units 1 through 4 the plow zone was 15 to 17 cm deep and these were dug to depths of 25 to 27 cm. All cultural remains from units 1 through 4 were recovered from the plow zone. No subsurface artifacts were found. Excavation of the backhoe trench encountered a small circular, trash-filled storage pit (Figs. 24 and 25, Plate 2). A 1 X 2 meter pit, units 5 and 6, was established over the feature for its manual excavation. The feature (Feature 1), was exposed below plow zone (approximately 30 cm below surface) and was cross-sectioned (Figs. 24 and 25, Plate 2) and recorded. The feature measured 95 cm in diameter and 35 cm in maximum depth. One side had a straight wall while the other was slightly undercut (Fig. 25). The bottom was flat. The plow had truncated the top of the pit. All soils within the feature were saved for water flotation and screening (See Chapter 10). Pottery recovered from the pit included Harlan Cord-Roughened ware diagnostic of the Keith complex. Tables 9 and 10 list the artifacts recovered from surface collections and test excavations.

Enough charcoal was recovered for three radiocarbon dates: A.D. 700.110 (UGa-5478), A.D. 900.70 (UGa-5482) and A.D. 730.55 (DIC-3325). This places probable occupation of the site at approximately A.D. 700 to A.D. 900 which agrees with other sites assigned to the Keith complex. Vertebrate faunal remains include two species of bird and one mammal. With the exception of one bird bone, all of these specimens were recovered from feature 1 (Table 11). In addition, 29.6 grams of mussel shell were recovered from the surface and excavations. A single shell fragment Maple-leaf mussel (Quadrula quadrula), weighing 14.3 grams, was contained within the feature.

Flotation focused on the contents of the trash-filled storage pit, feature 1. The entire matrix from the feature was water separated. No seeds, either fresh or charred, were recovered. Instead, the feature contained an abundance of *wood charcoal* (Table 12). Several large fragments were used for radiocarbon dating. Approximately 530 grams of charcoal was recovered. Since the contents of the feature represented redeposited trash, the charcoal may have been from a nearby hearth or part of a pole support for a house structure.

Interpretations

Site 25HN12 is a multicomponent site (based on ceramics) that includes occupations by both Keith and Upper Republican peoples. Excavations indicate the cultural remains are confined to the plow zone with the exception of features (e.g., trash filled storage pits) that have not been completely destroyed by modern cultivation. The terrace on which the site is situated is degrading (i.e., eroding), with probable complete destruction of all cultural remains in the near future. The presence of cultural features suggests semi-permanent or permanent occupation of the site during certain seasons of the year. Site size and the quantity of artifacts suggest semi-permanent settlement where hunting and gathering activities were conducted.

Intensive examination of the ground surface did not reveal the presence of another area with cultural remains. The description of Area 1 and Area 2 during the 1950 investigations suggest the 1985 investigations were in Area 1 where the Keith occupation was reported. This is substantiated by the recovered artifacts and radiocarbon dates. Area 2, the reported Upper Republican occupation at the site, could not be located. Because the site is situated on a degrading terrace, this portion of the site, Area 2, may have been completely destroyed during the intervening 35 years between 1950 and 1985.

Recommendations

Site 25HN12 is situated on a degrading terrace that has been subjected to intensive cultivation for several decades. Test excavations indicate all cultural remains, with the exception of bottoms of features, occur within the plow zone. The low density of recovered materials at this site make it much less significant than other sites in the area, and the effort to recover useful data would be disproportionate to the benefits. The absence of a cultural midden and truncation of features present does not permit the site being useful for addressing major research questions regarding the Keith and Valley complexes. Consequently, the authors do not recommend that the site be considered potentially eligibile for nomination to the National Register of Historic Places.

Table 9

25HN12
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-17 cm						
Unit 2						
0-17 cm				1	1	
17-27 cm						
Unit 3						
0-15 cm	3					
15-25 cm						
Unit 4						
0-15 cm	2			1	4	
15-25 cm						
Unit 5						
0-15 cm	2				2	
15-25 cm						
Unit 6						
0-15 cm	3					
15-25 cm						
Feature 1	1			1	2	
Totals	11			2	9	
Surface	26			6	4	

Table 10

25HN12 Tools

artifact	unit/level	description
projectile point	1 /20-30 cm	small triangular shaped, biface, corner notched, tip missing
point/knife	1 / 0-17 cm	triangular shaped biface, tip and base missing
end scraper	surface	sub-triangular shaped, uniface, plano-convex, base missing
preform	Feature 1	sub-rectangular shaped, biface, complete
biface resharpening flake	5 / 0-15 cm	distal end missing
retouched flakes	(3) surface	
daub	Feature 1	grass impressions, 11.8 g
burned earth	Feature 1 test units	14.2 grams 0.6 grams

Table 11

Taxonomic Composition and Distribution of Vertebrate Remains From Site 25HN12 (see Appendix B for Provenience)

Taxon	common names	NISP1	MNI2
AVES (NISP=3)	Birds		
Tetraonidae			
Pedioecetes phasianellus	Sharp-tailed grouse	2	2
Columbidae			
Zenaida macroura	Mourning dove	1	1
MAMMALIA (NISP=31)	Mammals		
Leporidae	Hares, Rabbits		
Sylvilagus sp.	Cottontail	31	2
Indeterminate mammal (N=1)	-	-	-
TOTAL		34	5

1 Number of identifed specimens

2 Minimum number of individuals

Table 12

Identified Flora From 25HN12

unit	level	taxon	common	amount
Feature 1			charcoal	591 g

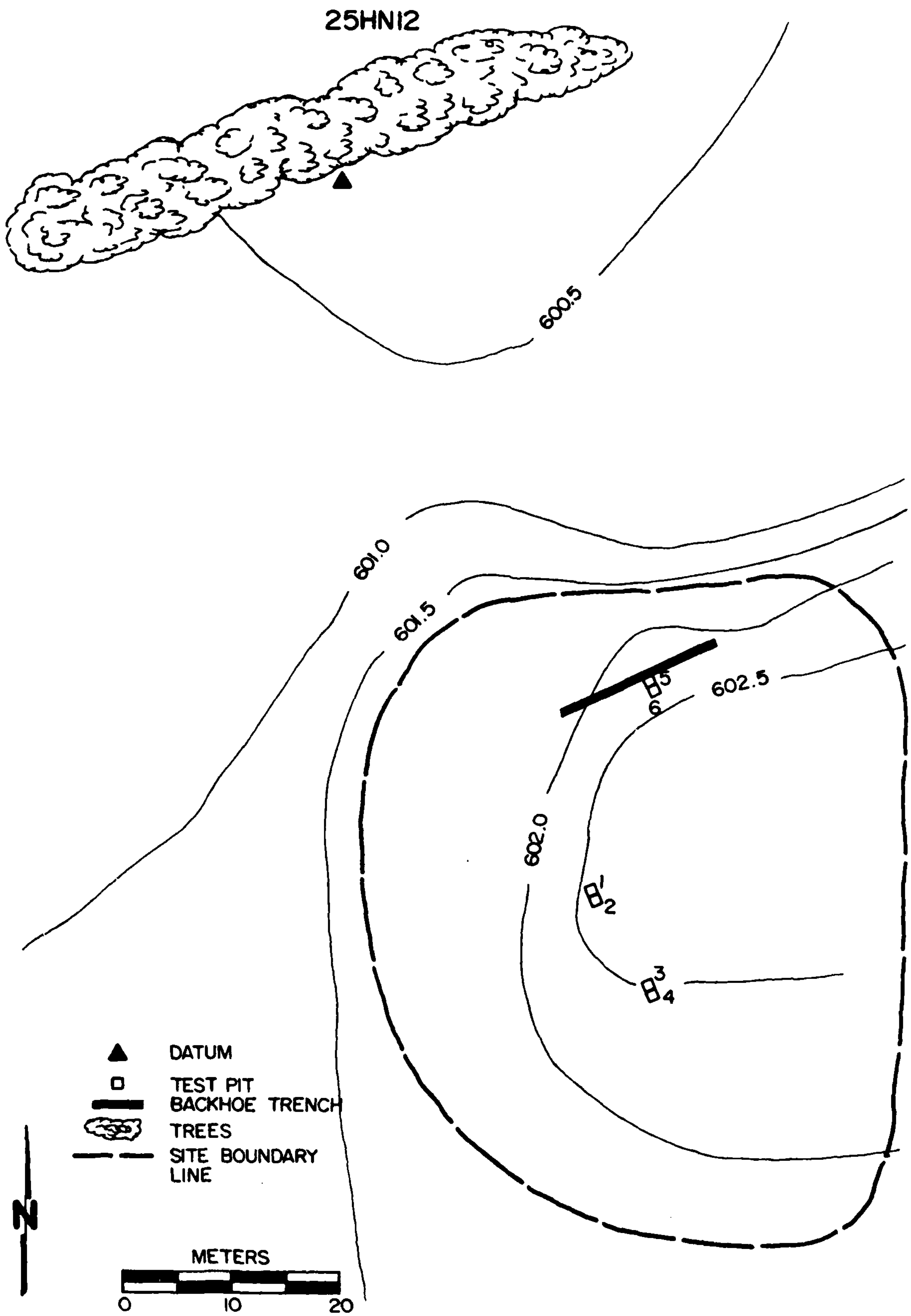


Figure 22. Site map of 25HN12.

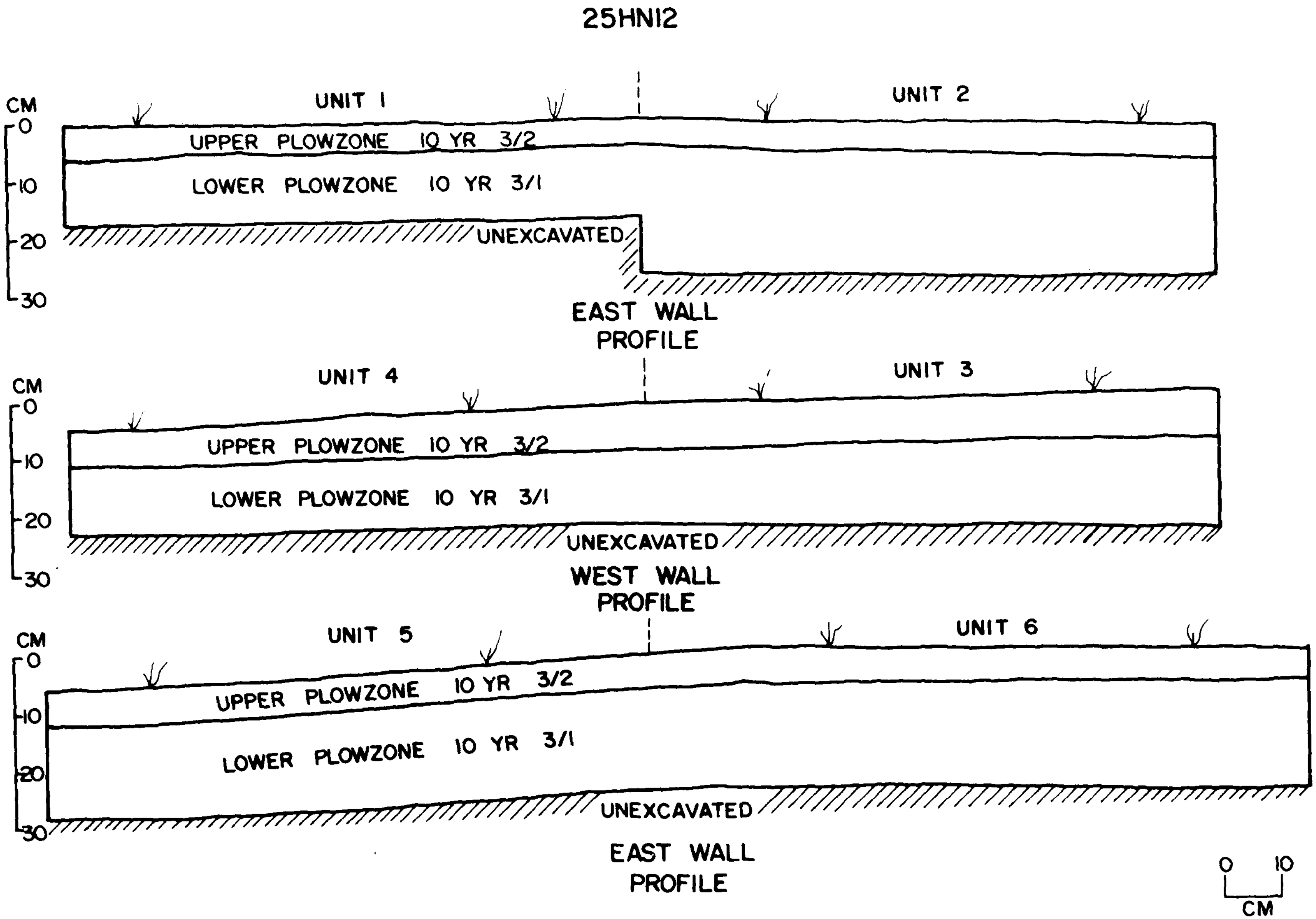


Figure 23. Profile of units 1, 2, 3, 4, 5, and 6 at site 25HN12.

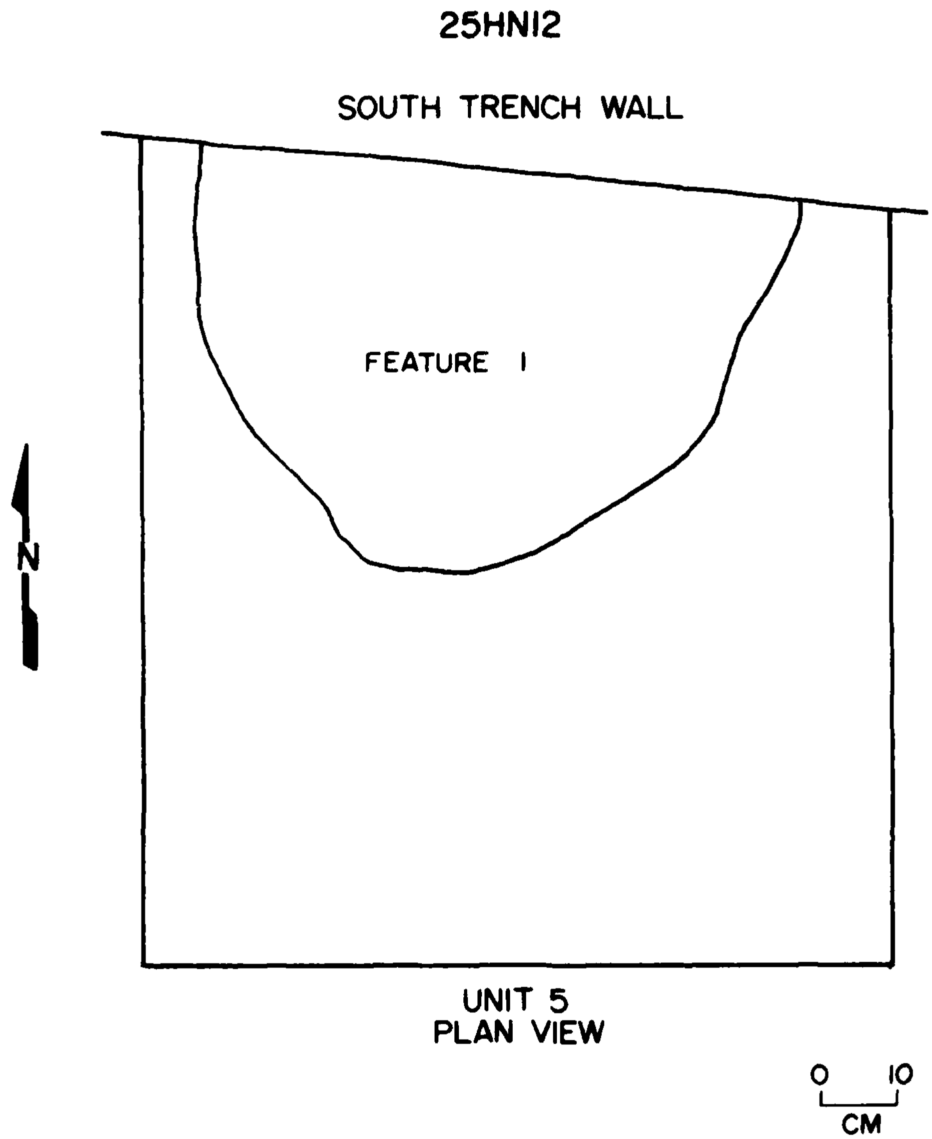


Figure 24. Plan view of feature 1 at site 25HN12.

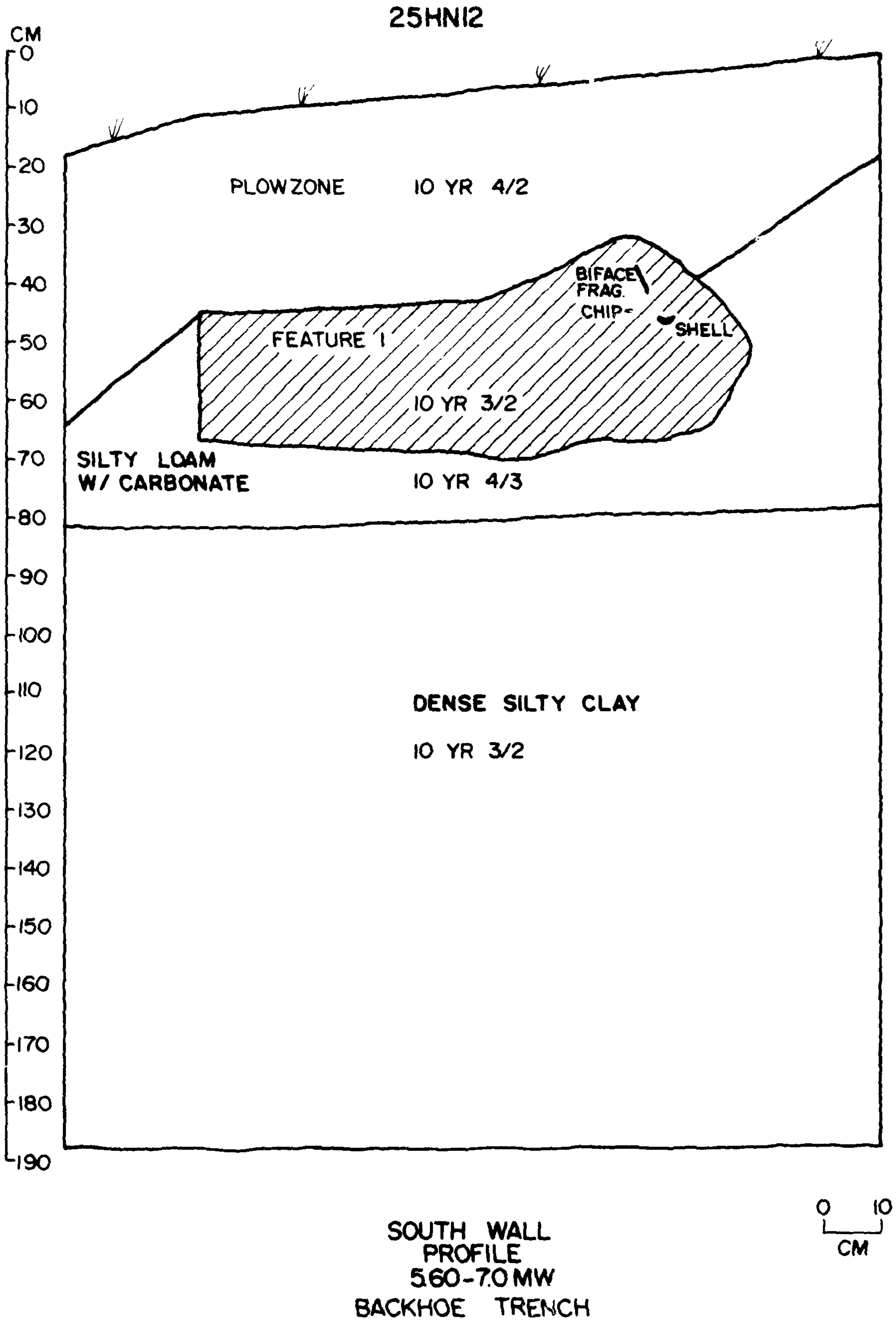


Figure 25. Profile of backhoe trench at site 25HN12.

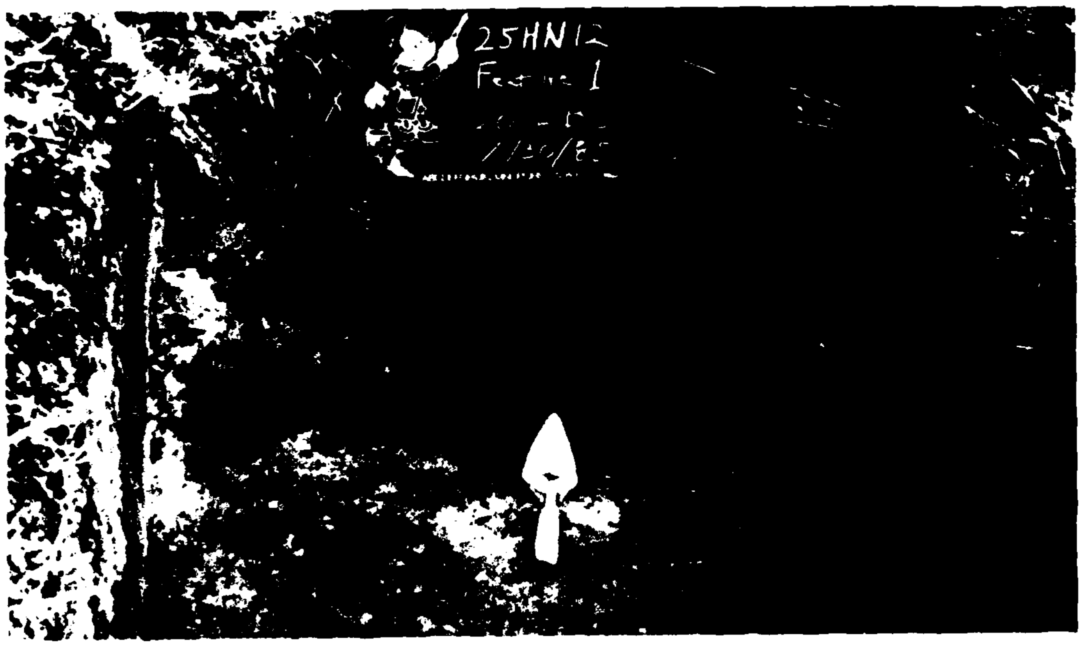


Plate 2. 25HN12, Feature 1. Top, unexcavated feature at 20 cm below surface; bottom, completely excavated feature.

25HN14

Figures	26 through 28
Site Type	Unknown
Recorded	1971, Nebraska State Historical Society
Size	None
Cultural Affiliation	None
Topographic Setting	Ridge, bench
Name	Fritzen Site
Drainage	Prairie Dog Creek
Surface Visibility	10 percent

Previous Research

The site was recorded in 1971 by the Nebraska State Historical Society. At that time the only items recovered from the site included bison teeth and bones (Roetzel et al. 1982).

1985 Investigations

Investigations included manual excavation of two 1 X 2 meter pits (Figs. 26 and 27). Excavations were conducted to a depth of 20 cm in loess soils (Table 13). No cultural remains were recovered. Evidence of rodent disturbance was prevalent. Examination of a cut bank on three sides of the site (i.e., east, north and west) (Fig. 28) did not reveal any buried cultural horizons.

Interpretations

Based on the faunal remains recovered by Roetzel et al. (1982) and the absence of cultural remains during the present investigations, this does not appear to be an archaeological site.

Recommendations

The site contains no cultural remains and does not warrant consideration for potential eligibility for nomination to the National Register of Historic Places.

Table 13

25HN14
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm						
10-20 cm						
Unit 2						
0-10 cm						
10-20 cm						
Unit 3						
0-10 cm						
10-20 cm						
Unit 4						
0-10 cm						
10-20 cm						
Totals						
Surface						

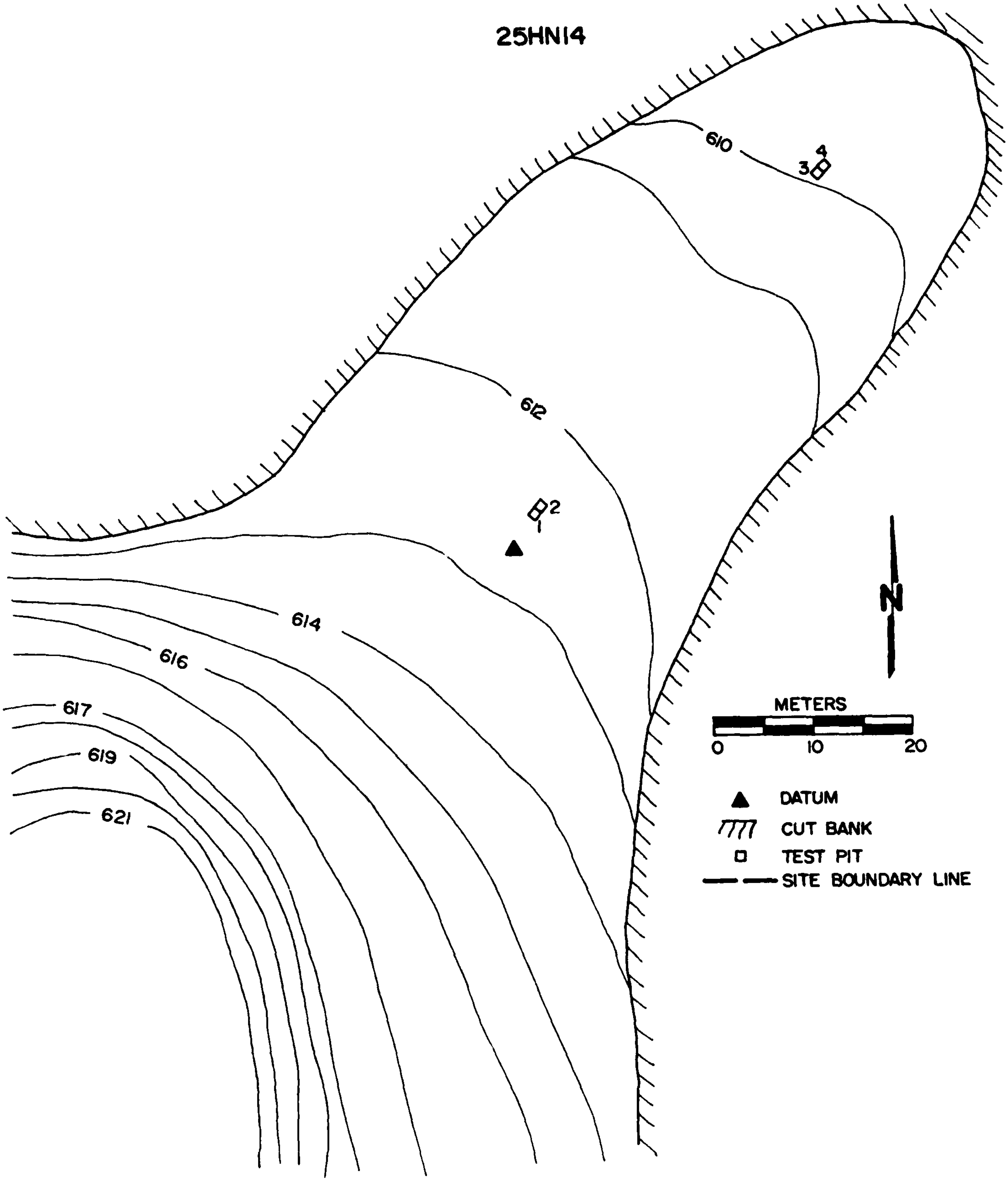


Figure 26. Site map of 25HN14.

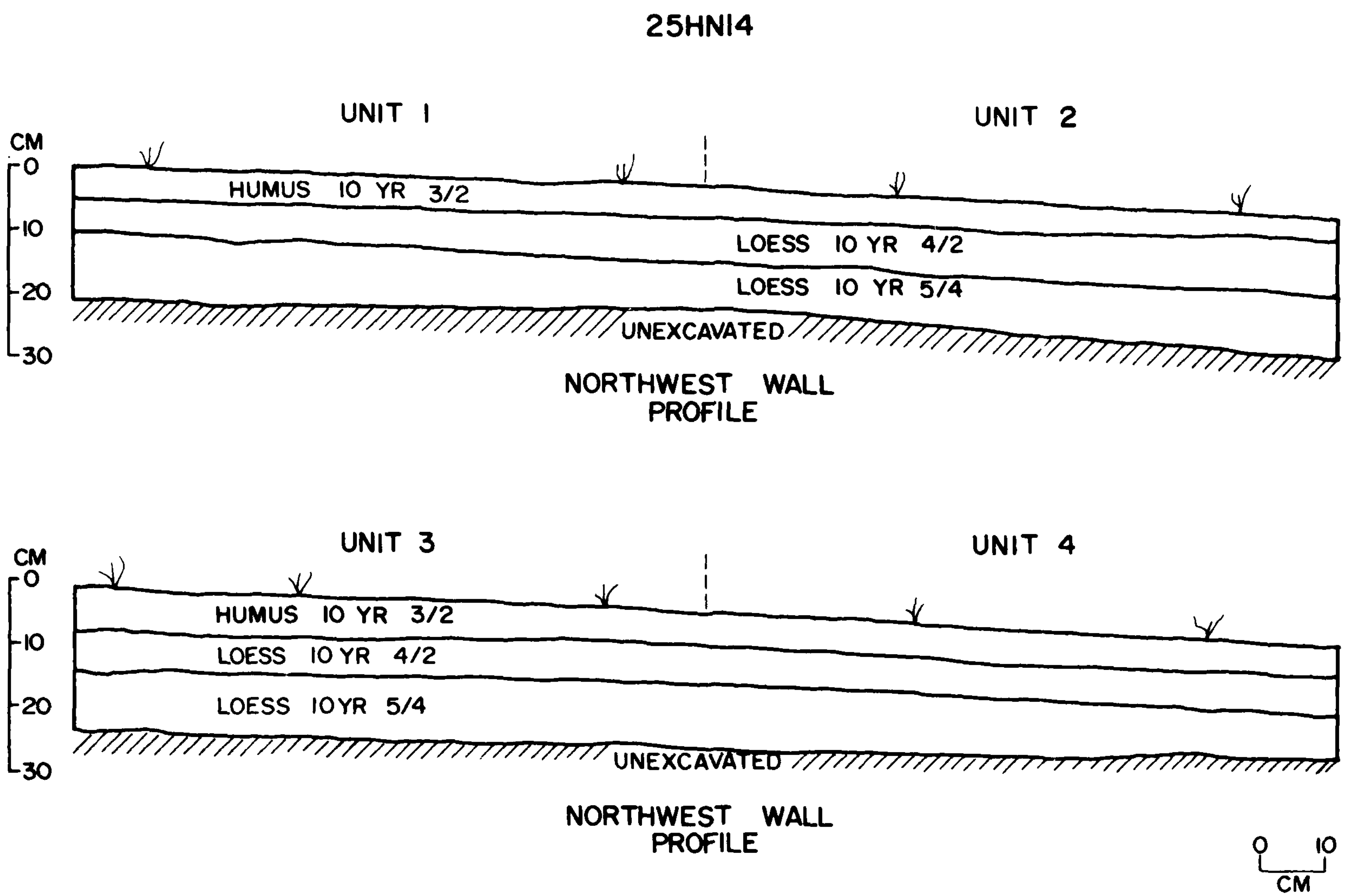


Figure 27. Profile of units 1, 2, 3, and 4 at site 25HN14.

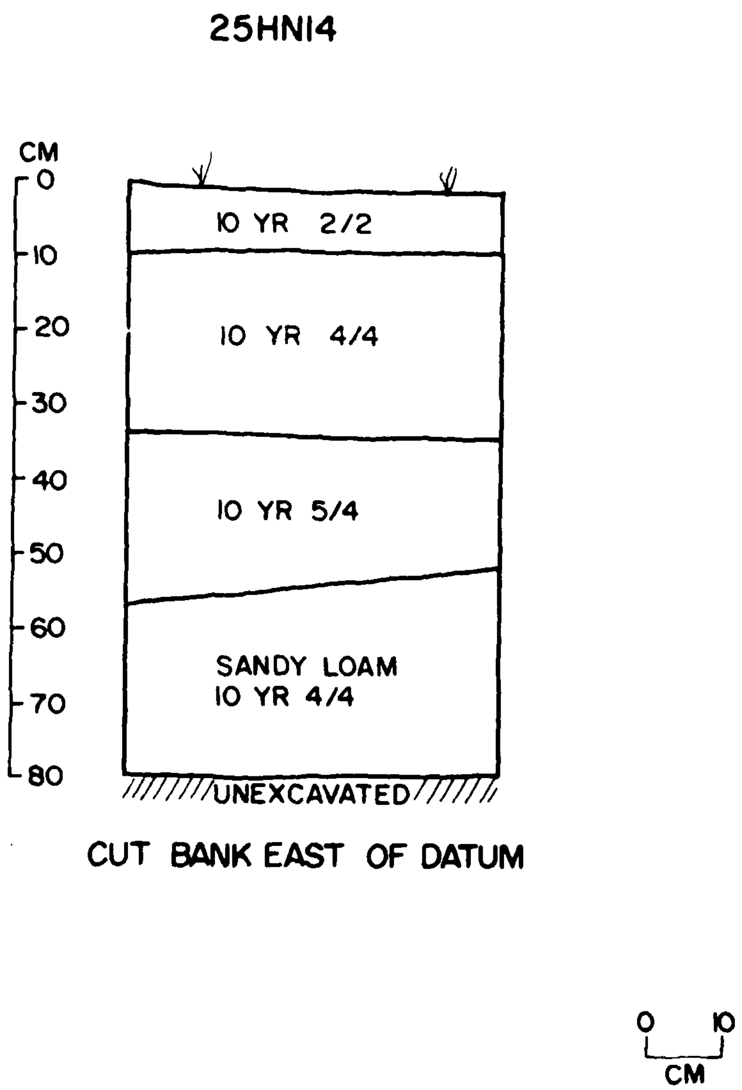


Figure 28. Profile of cut bank at site 25HN14.

25HN16

Figures	29 and 30
Site Type	Hunting and gathering camp
Recorded	1972, Midwest Archeological Center
Size	2,400 square meters
Cultural Affiliation	Possibly Paleo-Indian and post-contact
Topographic Setting	Hill top and beach
Name	Sindt Point
Drainage	Prairie Dog Creek, Republican River
Surface Visibility	25 percent

Previous Research

Falk and Thiessen (1972) list this site as unrecorded prior to the Midwest Archeological Survey of 1972. It is described as consisting of a surface scatter of lithics, ceramics, shell, bone fragments (including a horse metacarpal), and a fragment of a metal projectile point and as being located on a hill top and mud flat at the easternmost tip of Sindt Point (Fig. 29), The mud flat area is frequently washed over by the fluctuating shoreline.

Research conducted for this project at the University of Nebraska, Lincoln, suggests that this site may have been known prior to 1972 and may have been the focus of previous surface collections. Several artifact bags curated by the Department of Anthropology, University of Nebraska, Lincoln, are marked as coming from a site 25HN16; however, they do not contain materials collected in 1972. Although we have been unable to find reference to this site in published accounts, it is very possible that it was visited by crews associated with either the Nebraska Archeological Society or with the River Basin Survey in 1946.

These crews may have arbitrarily collected artifacts from the surface that are now being curated by the University of Nebraska, Lincoln. To our knowledge the only professional sub-surface investigations prior to this project were conducted in 1979 (Roetzel et al. 1982). A series of spot/transect collections and auger tests revealed little cultural material during the 1979-1980 investigations. The report suggests that the main portion of site 25HN16 may have been to the east of their excavations, in an area completely inundated, and in all probability, destroyed.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units on the bluff top at Sindt Point (Fig. 29). Extensive erosion along the face of the cliff and a high water line did not permit extensive examination of the beach. The two test units placed on the bluff top were excavated in arbitrary 10 cm levels to a depth of 30 cm (Table 14). The bluff top has been severely disturbed by terracing and tree planting by the U.S. Army Corps of Engineers (Fig. 29). There is also a vehicle trail that traverses the site. Excavations yielded one flake each from 10 to 20 cm level of units 1, 3 and 4. Examination of the cut bank did not reveal the presence of any deeply buried cultural horizons. The soils on the bluff top are loess and appear to be a relatively stable surface, with the exception of terracing.

Examination of the beach at the base of the cliff recovered artifacts consisting of flakes, a projectile point/knife, end scraper, mano and retouched flakes (Tables 14 and 15). Faunal remains of giant beaver, bison and camel (Table 16) were collected from the beach. The presence of giant beaver and camel is indicative of a late Pleistocene fauna. Paul Prettyman (local resident, Alma, personal communication 1985), informed the archaeology crew that a bison bone bed occurs on the beach at Sindt Point when the water recedes to a low level at the end of the summer. Because of high precipitation during the fall of 1985, the water level in Harlan County Lake did not recede enough to expose the bone bed. The authors believe it is important that this bone bed be examined by professional personnel as soon as possible whenever the water level recedes enough to expose it. The presence of giant beaver and camel suggests a Late Pleistocene age. The geomorphology and presence of now-extinct fauna on the beach indicates the artifacts collected from the beach probably eroded from the bluff top where test excavations were conducted.

Interpretations

Investigations in 1985 found evidence of cultural remains on the beach at Sindt Point. These, however, are believed to have eroded from the adjacent bluff top, based on geomorphology of the site and the presence of now-extinct Pleistocene fauna on the beach. Excavations on the bluff top indicates a thin cultural horizon that has been destroyed by terracing, tree planting and severe erosion of the cliff at Sindt Point. The site's topographic situation and the recovered remains suggest a temporary hunting and gathering camp that was possibly used by a variety of cultures, including historic groups (e.g., recovery of a metal projectile point). The recovery of giant beaver, camel and bison from the beach, in addition to information provided by Paul Prettyman about a bone bed, suggests the possibility of a Paleo-Indian occupation of the site on soils that compose the present beach. If a Paleo-Indian presence does occur at the site, it is likely to have been centered on large animal procurement and butchering activities.

Recommendations

Recommendations for Sindt Point are inconclusive. Cultural remains that occur on the top of the bluff have been severely disturbed by terracing, tree planting, a veihcle trail and bluff erosion. The low occurrence of cultural remains do not warrant consideration of the site for potential eligibility for nomination to the National Register of Historic Places. However, the presence of Pleistocene fauna (e.g., giant beaver and camel) from the beach below the bluff, and the possibility of an inundated bone bed (Paul Prettyman, local resident, Alma, personal communication 1985) are suggestive of a possible Paleo-Indian presence. This possibility makes the site potentially significant. It is recommended that the reported bone bed be examined by professional personnel at the earliest possible time whenever the lake water recedes enough to expose it. Until the bone bed is examined, this site should be considered potentially significant.

Table 14

25HN16
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm						
10-20 cm						
20-30 cm	1					
Unit 2						
0-10 cm						
10-20 cm						
20-30 cm						
Unit 3						
0-10 cm						
10-20 cm	1					
20-30 cm						
Unit 4						
0-10 cm						
10-20 cm	1					
20-30 cm						
Totals	3					
Surface (beach)	91	1		7		

Table 15

25HN16 Tools

artifact		unit/level	description
point/knife		beach	triangular shaped biface, complete
knife	(2)	beach	sub-rectangular shaped, biface, complete
end scraper		beach	sub-triangular shaped, uniface, plano-convex, complete
retouched flakes	(2)	beach surface	
mano		beach	fragment, 30.7 grams

Table 16

Taxonomic Composition of Vertebrate Remains Recovered From the Beach at Site 25HN16

Taxon	common names	NISP	MNI
MAMMALIA (NISP=4)	Mammals		
Castoridae	Beavers		
Castoroides ohioensis	Giant Beaver	1	1
Camelidae	Camels and Llamas	2	1
Bovidae	Bos and Bison		
Bison sp.	Bison	1	1
Indeterminate mammal (N=3)		-	-
TOTAL		4	3

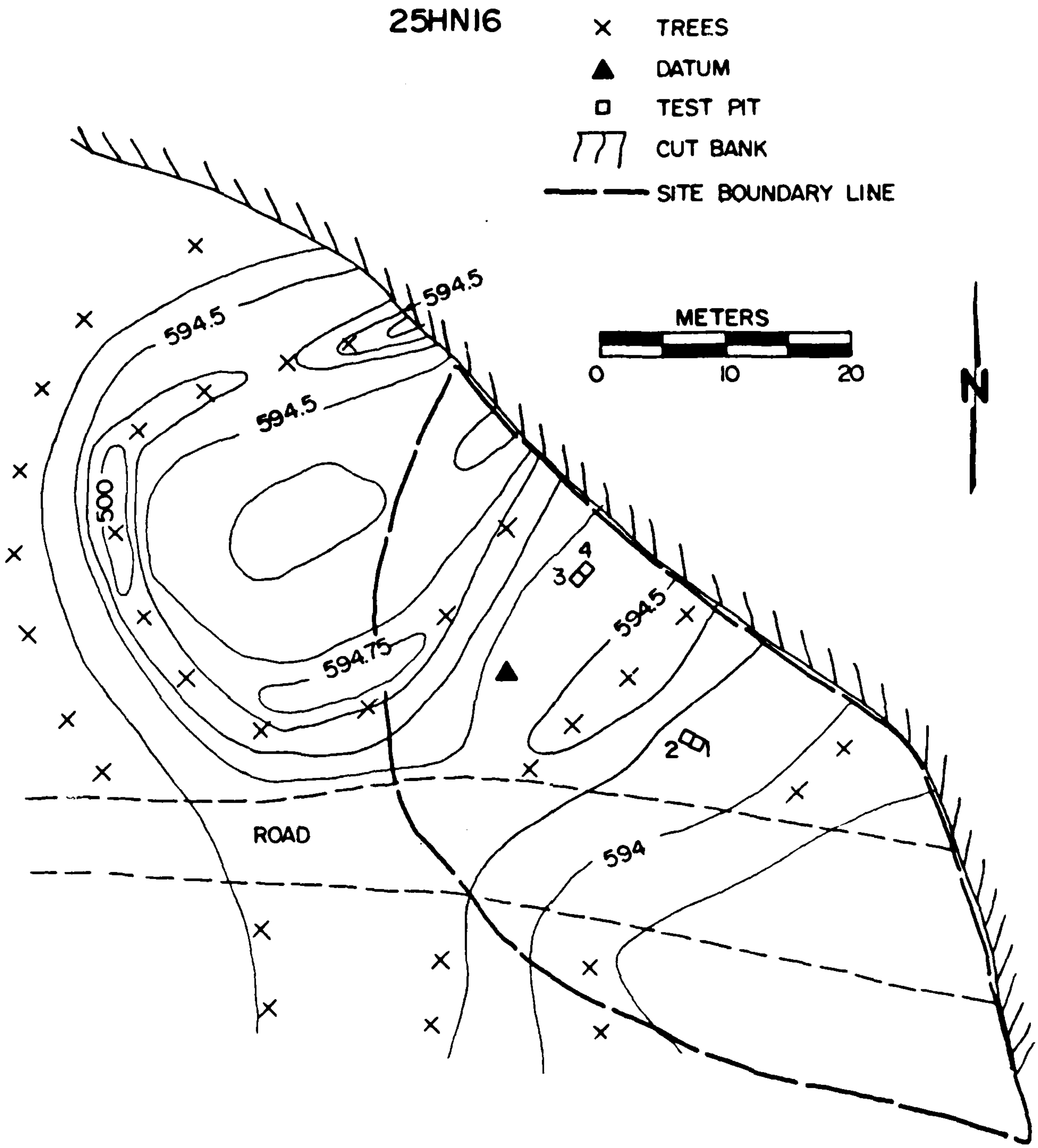


Figure 29 Site Map, Sindt Point (25HN16).

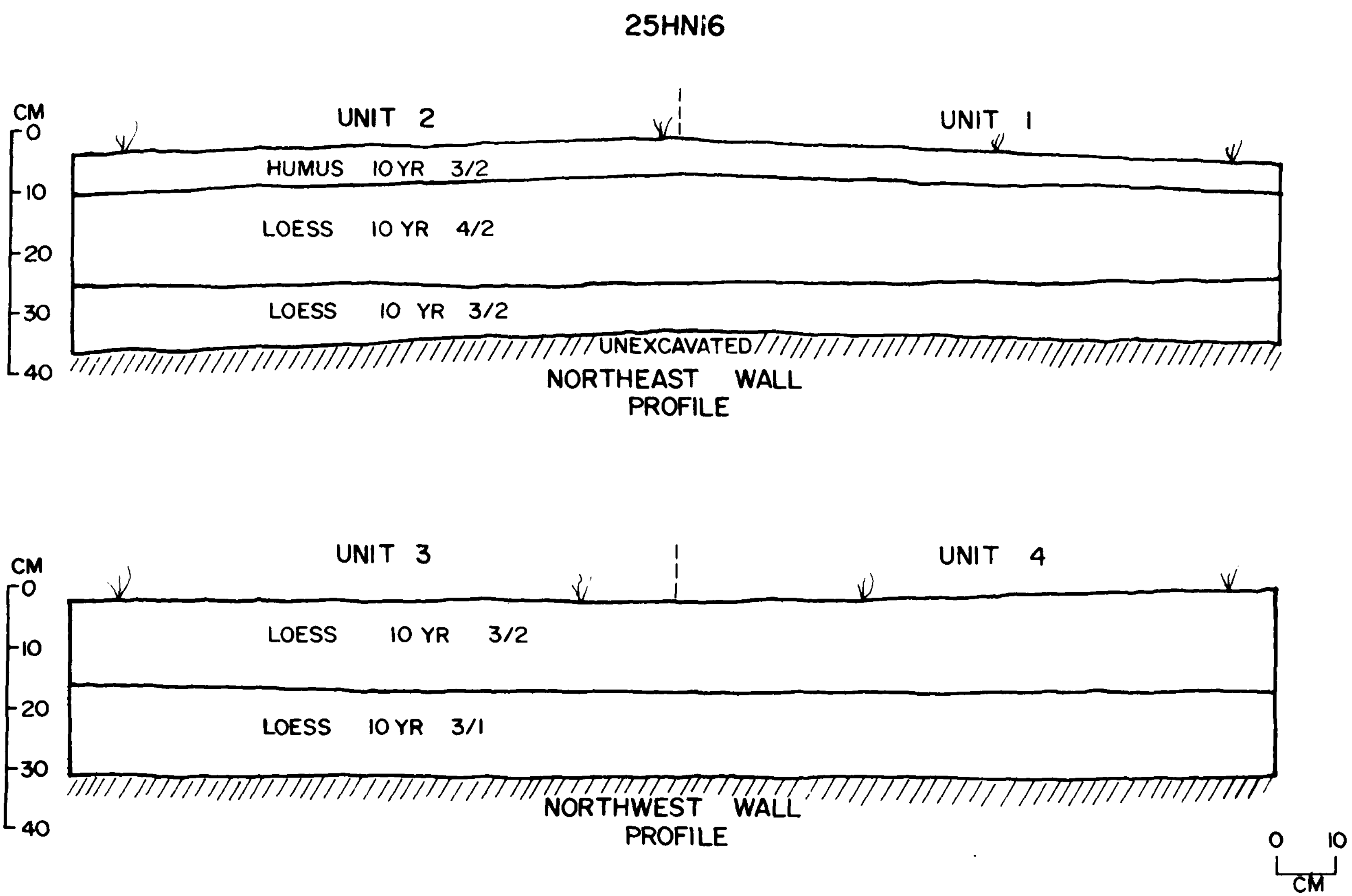


Figure 30. Profile of units 1, 2, 3, and 4 at site 25HN16.

25HN31

Figures	31 through 35
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	4,500 square meters
Cultural Affiliation	Upper Republican
Topographic Situation	Terrace
Name	Stevenson Village
Drainage	Republican River
Surface Visibility	10 percent

Previous Research

Located on a terrace remnant approximately six meters above normal pool level, this site was originally tested in 1931 by A.T. Hill and local amateurs (Pepperl and Falk 1978:15). No records can be found of the results of these investigations. Records do exist, however, for the 1946 investigations by Hill and Kivett with the River Basin Survey. Ninety small test pits (size unknown), plotted on a field map, extend over an area of approximately 244 meters east-west and 155 meters north-south. The subsurface tests indicated a dark midden area about 45 cm thick beginning about 45 cm below surface. The heavy concentration of cultural debris suggested the possibility of structures and the recovered ceramics indicated an Upper Republican occupation.

1985 Investigations

Tests conducted in 1985 were designed to address three issues: (1) how the cultural deposits correspond in depth to those described by the 1946 investigations; (2) the possible presence of remains of any structures; and (3) the relationship of the site area to the cut bank mentioned by Pepperl and Falk (1978:14-15). Their 1977 survey suggests that the site area probably includes the present shoreline cut bank.

Investigations consisted of manual excavation of three 1 X 2 meter units and two adjoining 1 X 1 meter units and excavation of one backhoe trench (Figs. 31 through 35). All manual excavations were in arbitrary 10 cm levels. Depths of manual excavations varied from 30 to 70 cm and the backhoe trench was dug to a depth of 200 cm (Figs. 32 through 35). The backhoe trench, which was dug perpendicular to the cut bank, did not reveal evidence of any deeply buried cultural horizons. The uppermost soils consisted of silt overlying a buried paleosol (Fig. 35). The depth of cultural remains varied across the site. Most cultural materials were less than 40 cm deep. Examinations of the backhoe trench, and the cut bank, discerned a buried paleosol at a depth of 40 cm (Fig. 35). Very little or no cultural material was observed or recovered from the paleosol.

Ceramics recovered from the site indicate an Upper Republican occupation. The soil profiles suggest that agricultural activities have disturbed much of the cultural material present. There were no surface indications of house depressions. Examination of the beach below the site yielded several finely worked stone tools that include a large knife (Tables 17 and 18). A total of 54.8 grams of mussel shell, of which 44.5 grams are of maple-leaf mussel (*Quadrula quadrula*), were removed from the cut bank. A small number of animals bones were also recovered (Table 19). The horse (Table 19) was found on the beach and is not associated with the Upper Republican occupation at the site.

Interpretations

Site 25HN31 appears to have been a temporary, seasonal, hunting and gathering camp used by Upper Republican peoples. The diffuse cultural remains suggest several possibilities: (1) the site was used repeatedly over a short period of time; (2) the site was used only once for a short period of time; or (3) the main part of the site has been destroyed by extensive shoreline erosion. The authors believe the latter interpretation is correct. The site setting is ideal for a small hamlet or village that is typical of the Upper Republican complex. The occurrence of nicely worked stone tools on the beach indicate portions of the site have been eroded away. Previous investigations and those during 1985 suggest the site was a hunting and gathering camp where specialized activities were performed. Fauna remains recovered from excavations include mice (*Peromyscus* sp.), horse, deer and bison-size animals (Table 19) and the maple-leaf mussel (*Quadrula quadrula*).

Recommendations

Site 25HN31 has been disturbed by plowing and extensive shoreline erosion. Examination of a buried paleosol, exposed along an extensive cut bank and in a backhoe trench that was dug perpendicular to the cut bank, at a depth of 40 cm did not reveal the presence of a deeply buried cultural horizon. Investigations recovered only a low frequency of cultural materials. There is no indication this site should be considered potentially significant or eligible for nomination to the National Register of Historic Places.

Table 17

25HN31
Artifacts

Unit 1	flakes	blades	potlids	shatter	sherds	historic
0-10 cm					3	
10-20 cm					1	
20-30 cm						
Unit 2						
0-10 cm	1			1		
10-20 cm	1					
20-30 cm					1	
30-40 cm					1	
40-50 cm						
Unit 3						
0-10 cm	1					
10-20 cm						
20-30 cm						
30-40 cm	1					
40-50 cm						
50-60 cm					1	
Unit 4						
0-10 cm						
10-20 cm						
20-30 cm					1	
30-40 cm						
Unit 5						
0-10 cm						
10-20 cm						
20-30 cm				1		
30-40 cm						
40-50 cm						
Unit 6						
0-10 cm	2				1	
10-20 cm	1	1		1	1	1 metal
20-30 cm	3					
30-40 cm						
40-50 cm						
50-60 cm						
60-70 cm						

Table 17 cont.

<u>Unit 7</u>						
0-10 cm	1					
10-20 cm						
20-30 cm	4					
30-40 cm	18			7		
<u>Unit 8</u>						
0-10 cm						
10-20 cm	3	1		2		
20-30 cm	14	1		2		
Totals	49	3		14	10	1
Surface (beach, trench)	2		1	1	6	

Table 18

25HN31 Tools

artifact	unit/level	description
projectile point	7 /20-30 cm	small triangular shaped, biface, corner notched, tip and base missing
knife	beach	triangular shaped biface, base and tip missing
	beach	sub-rectangular shaped, biface, base missing
side scraper	beach	sub-rectangular shaped, uniface, plano-convex, complete
chopper	beach	circular shaped biface, tip or working edge partly missing
tin can	6 /10-20 cm	fragment, 1.1 grams

Table 19

Taxonomic Composition of Vertebrate Remains From Site 25HN31 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
MAMMALIA (NISP=6)	Mammals		
Cricetidae	New World Rats and Mice		
Peromyscus sp.	White-footed Mice	1	1
Unidentified cricetid		1	1
Equidae	Horses		
Equus sp.	Horse	1	1
Cervidae	Wapiti, Deer		
Odocoileus sp.	Deer	1	1
Bison-size	Bison	2	2
Indeterminate mammal (N=35)		-	-
TOTAL		6	6

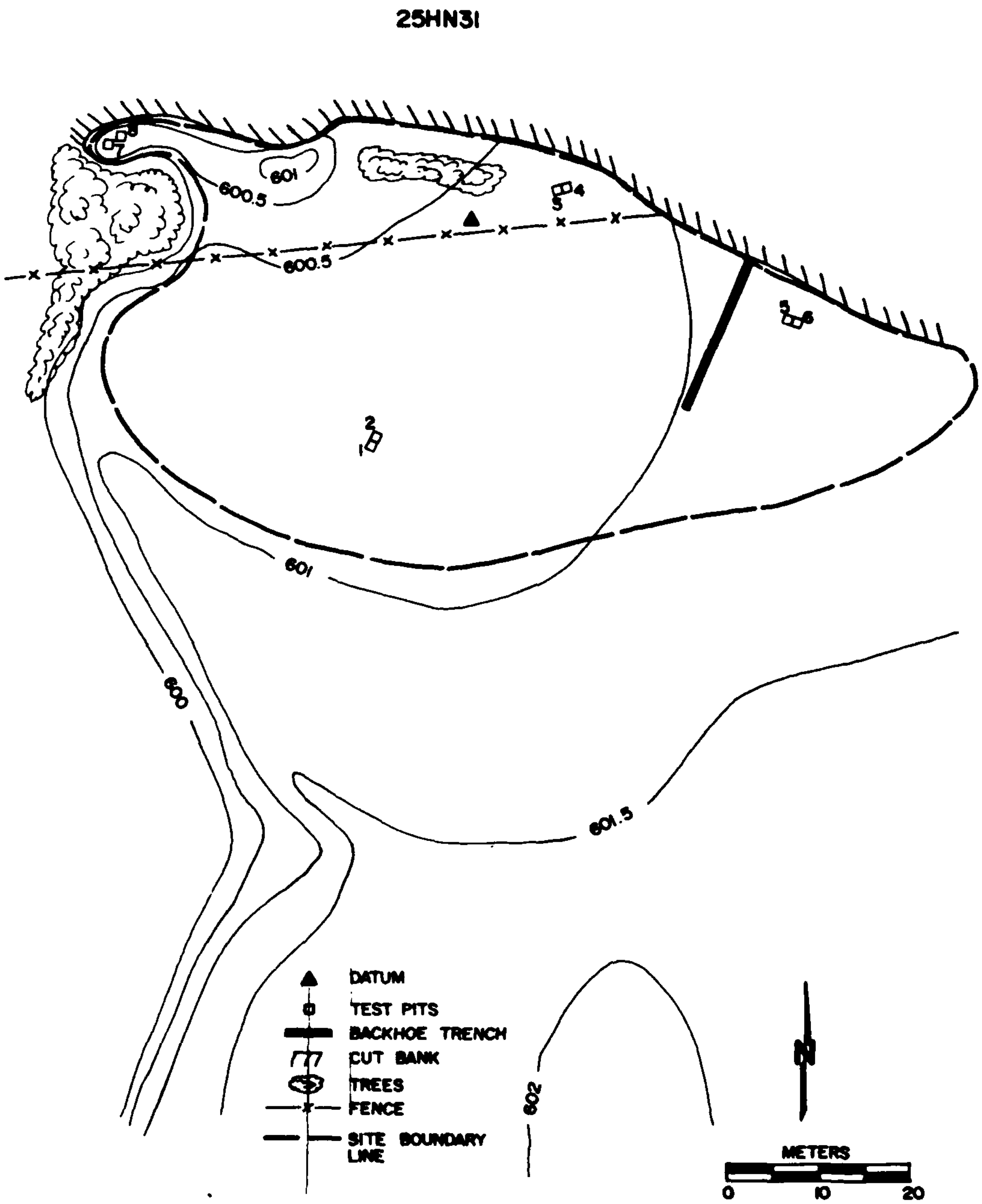


Figure 31. Site map of 25HN31.

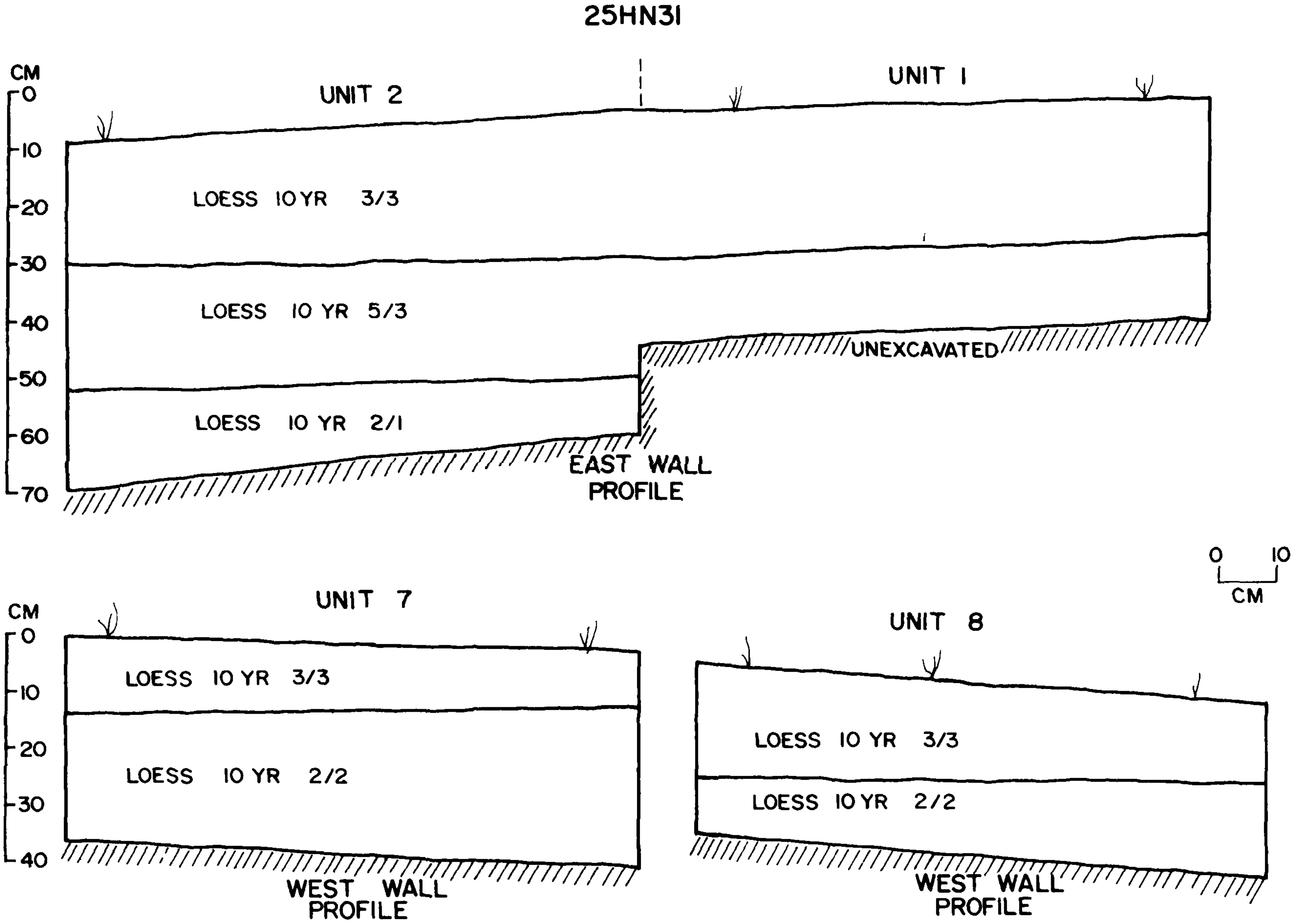


Figure 32. Profile of units 1, 2, 7, and 8 at site 25HN31.

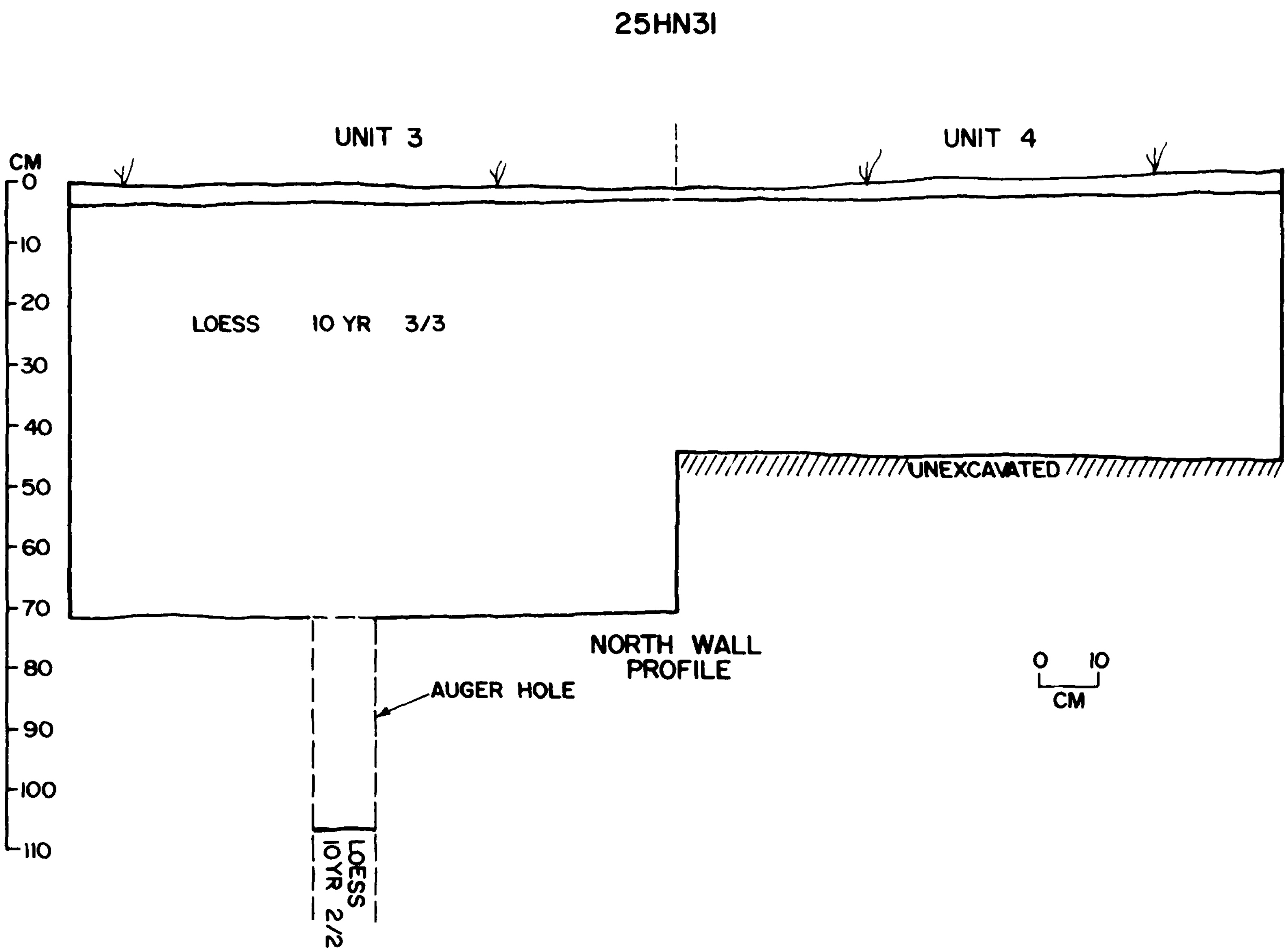


Figure 33. Profile of units 3 and 4 at site 25HN31.

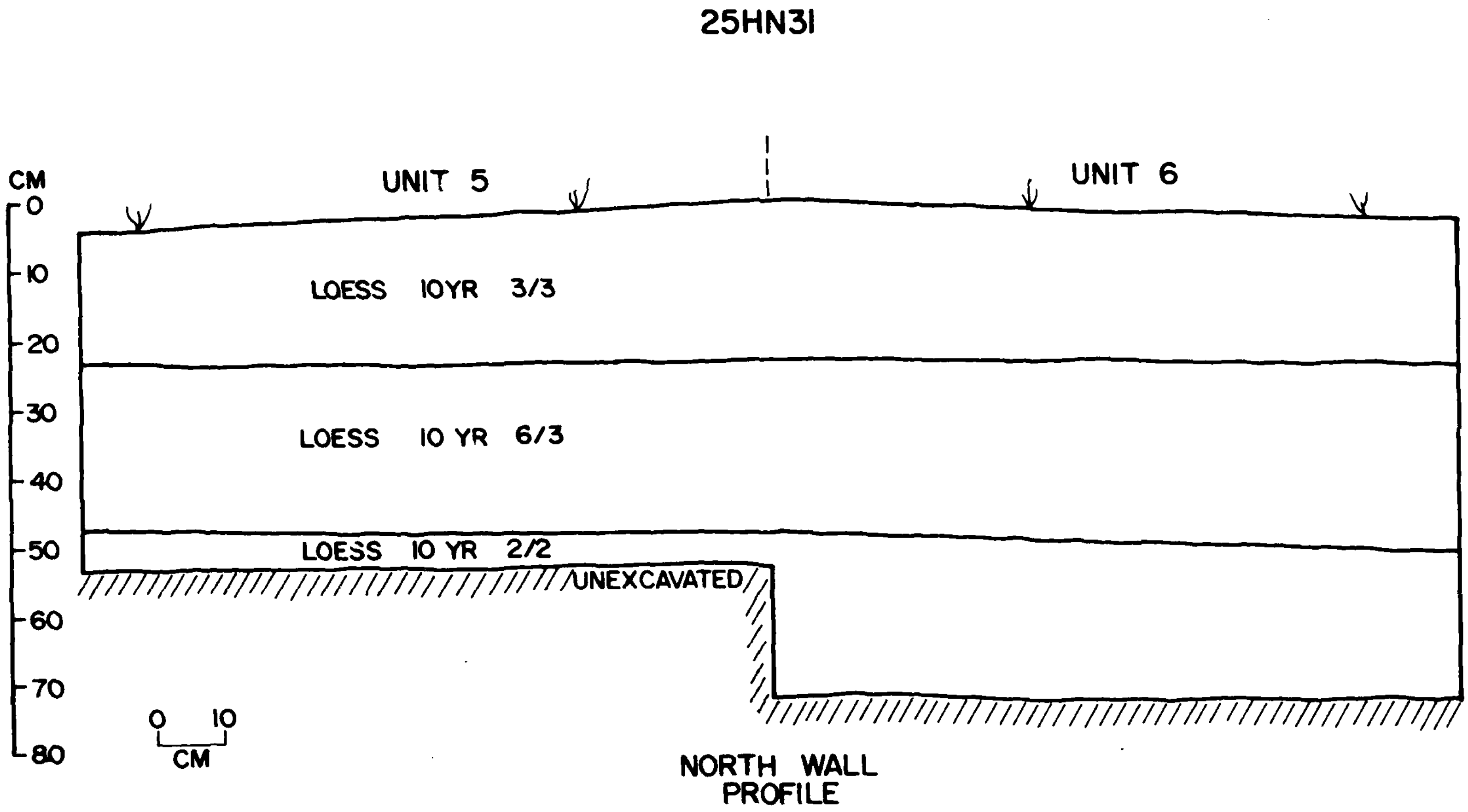


Figure 34. Profile of units 5 and 6 at site 25HN31.

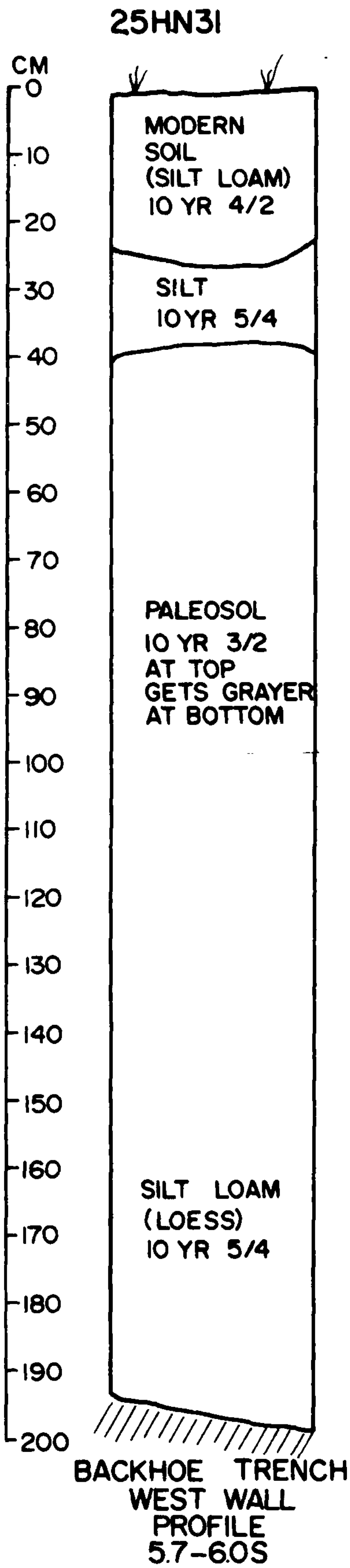


Figure 35. Profile of backhoe trench at site 25HN31.

25HN32

Figures	36 through 38
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	5,000 square meters
Cultural Affiliation	Plains Woodland
Topographic Setting	Hill slope and terrace
Name	Unnamed
Drainage	Cook Creek
Surface Visibility	50 percent

Previous Research

This site is located on a hill slope and terrace above Cook Creek, east of present-day Alma. When it was first recorded in 1946, it consisted of two storage pits exposed in a road cut. These features were photographed, measured and excavated. "The pits were filled with dark arth (sic) containing much ash, burned earth and camp detritus" (University of Nebraska, site files). In addition, a surface collection was made on the site, yielding "thick cord-marked pottery sherds, bone, lithic flakes, burned earth, and other stones" (Pepperl and Falk 1978:15). The site was revisited in 1972, at which time it was in tall grass, making surface visibility difficult. In 1979 subsurface investigations were conducted by a crew from Impact Services of Mankato, Minnesota. Four shovel tests, excavated to a depth of 85-100 cm, and the examination of a cut bank that bounds the site on the north and east reaffirmed the site's status concluded by earlier investigations. Specifically, all prior investigations indicated that the site had been destroyed by the construction of U.S. Highway 136. However, the two latter projects noted thick vegetation cover at the site, a situation that greatly impaired surface visibility. Because the field in which the site is located was plowed and planted in crop in 1985, our investigations focused on the extent of any remaining sections of the site.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units and excavation of two backhoe trenches (Figs. 36 and 38). Manual excavations indicated cultural remains were confined to the plow zone and/or disturbed soils. Cultural remains in units 3 and 4 were mostly in the top 20 cm while in units 1 and 2 cultural remains continued to a depth of 70 cm with the most occurring in the uppermost 40 cm (Table 20). Historic glass and metal were found at a depth of 40 cm. Cultural remains found at a greater depth in units 1 and 2 can be attributed to grading work of an adjacent road that buried them. The southwest 50 X 50 cm corner of unit 1 was dug to 70 cm while the rest of the unit was dug to a depth of 50 cm.

Artifacts recovered included flakes (Table 20). A projectile point was found in unit 1 at a depth of 20-30 cm. It is a small triangular form with corner notches. The tip is missing. An indeterminate biface was recovered from unit 3 at a depth of 0-20 cm. Its tip is also missing. A fragment of a groundstone (quartzite) tools was recovered from unit 1 at a depth of 20-30 cm. Two fence staples were recovered from unit 4 at a depth of 20-30 cm. The manual excavations also yielded two unidentifiable bone fragments.

The two backhoe trenches were oriented perpendicular to each other (Fig. 36). This was done to obtain a better profile of the hill slope and terrace on which the site occurs. The backhoe trenches were dug to depths of 160 and 170 cm (Fig. 38). There is no evidence of deeply buried cultural horizons. The trenches indicated the plow zone varies considerably in depth across the site.

Interpretations

Previous investigations and results of present investigations suggest the site was a semi-permenant settlement (e.g., storage pits) occupied by Plains Woodland (?Keith) peoples. The site may have been used seasonally as a hunting and gathering camp.

Recommendations

Present investigations indicate the cultural remains at the site have been severely disturbed by cultivation and road construction. Investigations recovered a low frequency of cultural remains that have been adversely affected by previous construction and farming activities. There is no evidence that the site is significant or warrants consideration for potential eligibility for nomination to the National Register of Historic Places.

Table 20

25HN32
Artifacts

Unit 1	flakes	blades	potlids	shatter	historic
0-20 cm					
20-30 cm					
30-40 cm	1				
40-50 cm					
50-70 cm	1				
(SW 50 x 50 cm only)					
Unit 2					
0-20 cm	2				
20-30 cm	1				
Unit 3					
0-20 cm	2				
20-30 cm	1				
Unit 4					
0-20 cm	1				
20-30 cm					2 fence staples
30-40 cm					
Totals	9				2

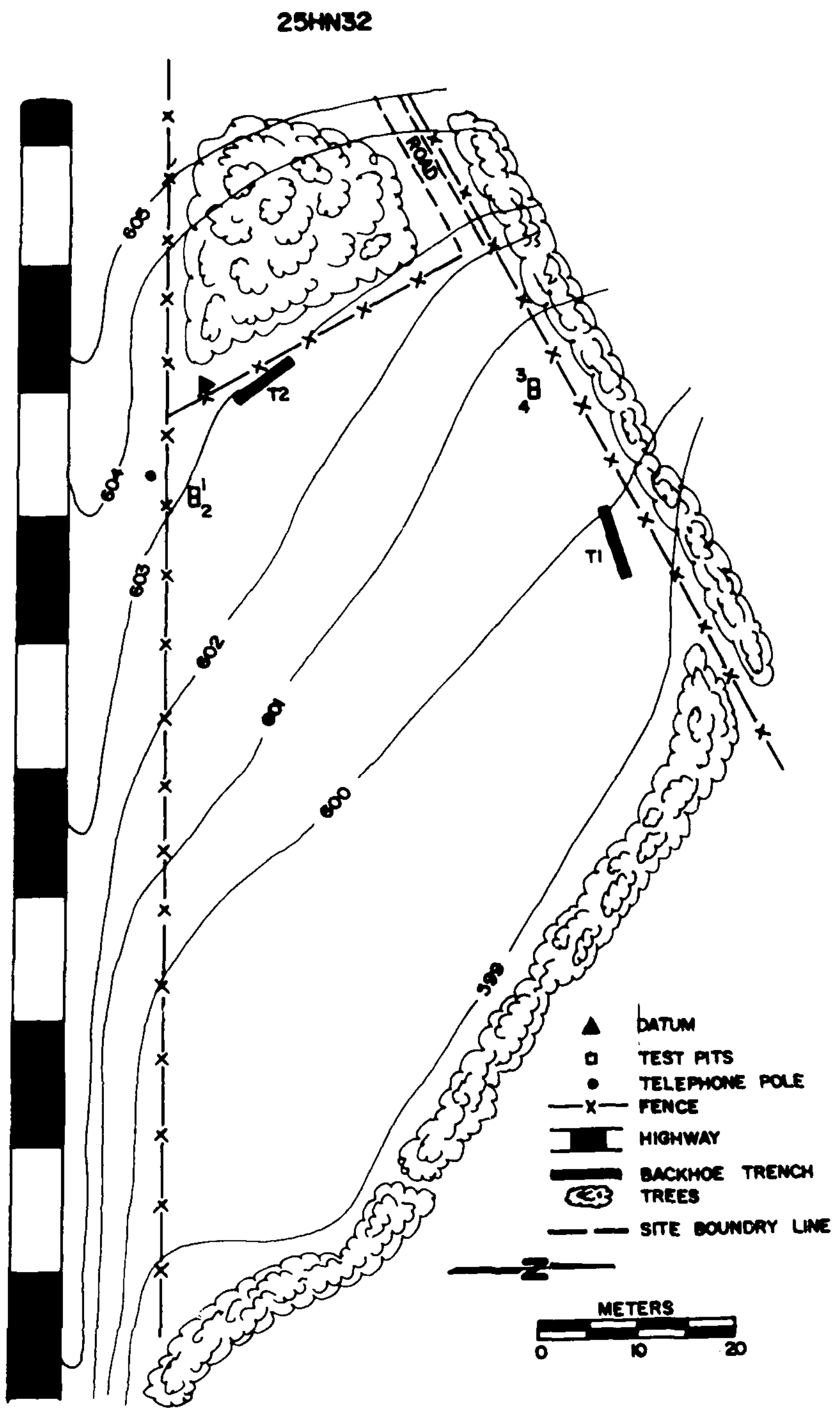


Figure 36. Site map of 25HN32.

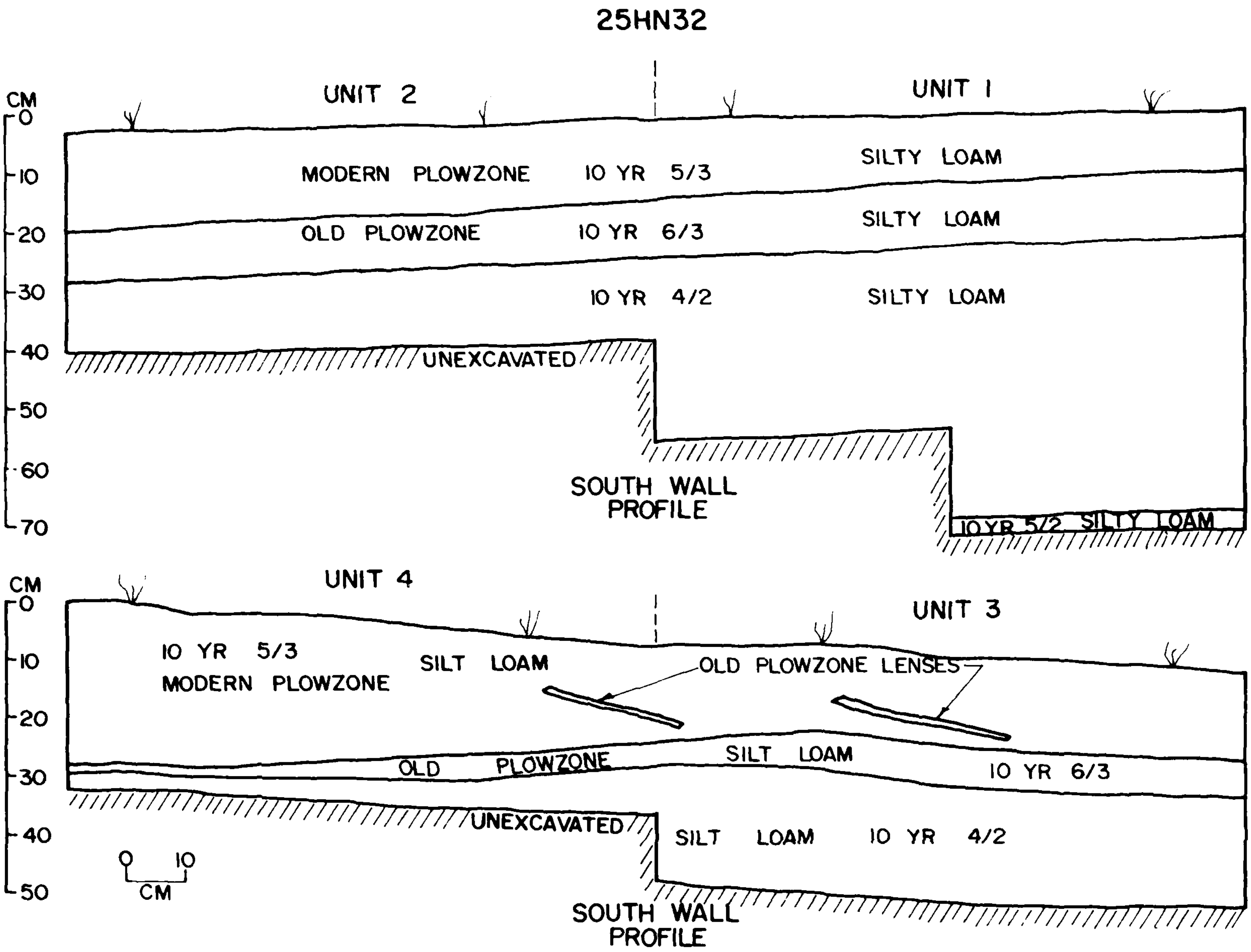


Figure 37. Profile of units 1, 2, 3, and 4 at site 25HN32.

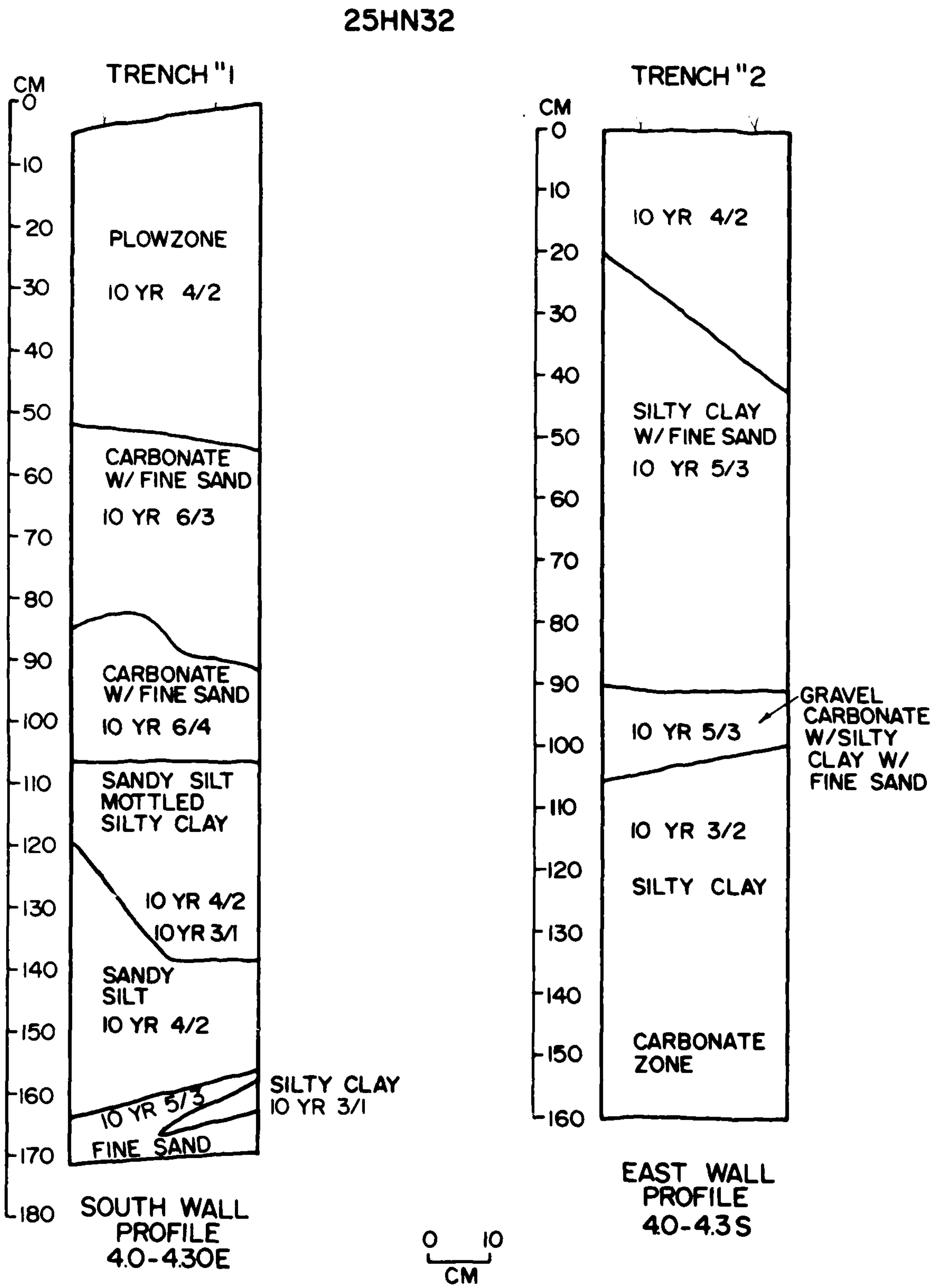


Figure 38. Profile of backhoe trenches at site 25HN32.

25HN33

Figures	39 and 40
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	2,000 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Terrace slope
Name	Unnamed
Drainage	Republican River
Surface Visibility	10 percent

Previous Research

This Upper Republican habitation site is located on a terrace slope of a small tributary of the Republican River. It was first recorded and tested in 1946 by the River Basin Survey and revisited in 1950 by the field school from the University of Nebraska at Lincoln. The first investigation yielded Upper Republican-like ceramics, lithic debris, shell and an animal scapula while the second excavations did not recover any cutural material (Pepperl and Falk 1978:16). When the site was revisited in 1872 and 1977 by the Midwest Archeological Center survey, no evidence of occupation was observed either on the terrace surface or in the exposed profile. The survey did note, however, that the surface area was under heavy grass cover and that the profiled cut bank was actively slumping due to erosion and wave action. Based on these difficult field conditions, it was determined that the site needed further investigation. The 1985 field objectives focused on delineating extant portions of the site.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units and examination of the extensive cut banks on the north and west sides of the site. Manual excavations were in arbitrary 10 cm levels. Units 1 and 3 were dug to a depth of 20 cm and units 2 and 4 were dug to a depth of 30 cm (Table 21). All cultural remains were recovered from the uppermost 20 cm. Soils consisted of a humus horizon and alluvium. No cultural remains were observed in the cut bank. Few artifacts were found on the beach below the site. A complete notch was recovered from unit 2 at a depth of 10-20 cm and a square, machine-cut nail was recovered from unit 1 at a depth of 10-20 cm. The nail is broken, making determination of penny weight impossible. A bison/wapiti-size rib fragment was recovered from the beach. A prairie vole (*Microtus ochrogaster*) mandible was recovered from the 0-10 cm level of unit 4.

Interpretations

Based on previous and present investigations, the site appears to have been a hunting and gathering camp used by Upper Republican peoples. The infrequent occurrence of cultural remains suggests the site has either been mostly destroyed by shoreline erosion or the occupation of the site was of such a short duration that large quantities of cultural remains did not accumulate.

Recommendations

The north edge of site 25HN33 is being severely eroded. Test excavations and examination of an extensive cut bank did not reveal any substantial quantity of cultural remains. There is no indication that the site is significant or warrants consideration for potential eligibility for nomination to the National Register of Historic Places.

Table 21

25HN33
Artifacts

Unit 1	flakes	blades	potlids	shatter	sherds	historic
0-10 cm	3	1				
10-20 cm	6			1		1 nail
Unit 2						
0-10 cm	1			2		
10-20 cm	7					
20-30 cm						
Unit 4						
0-10 cm	1			1		
10-20 cm						
20-30 cm						
Totals	18	1		4		1
Surface (beach)	3					

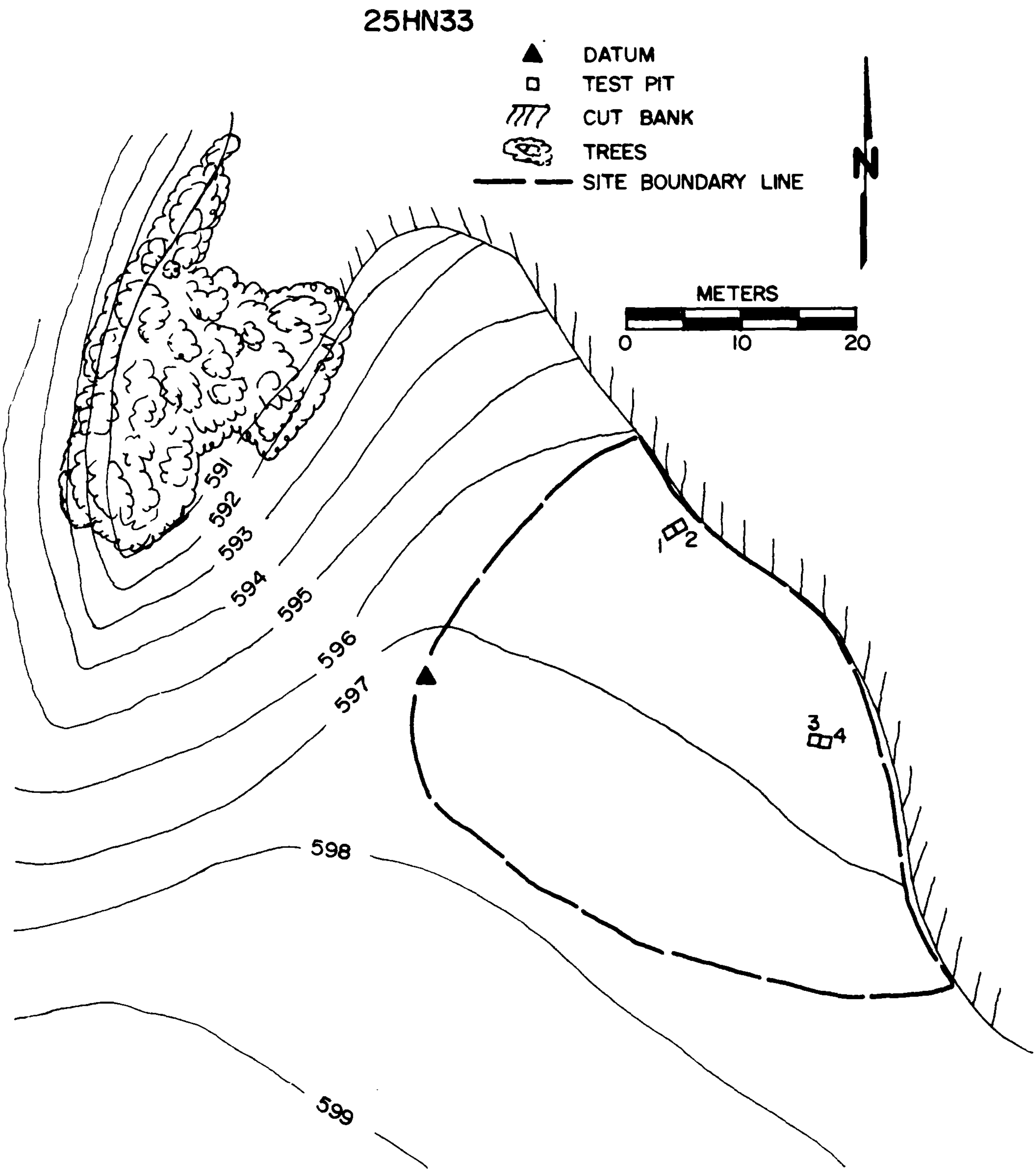


Figure 39. Site map of 25HN33.

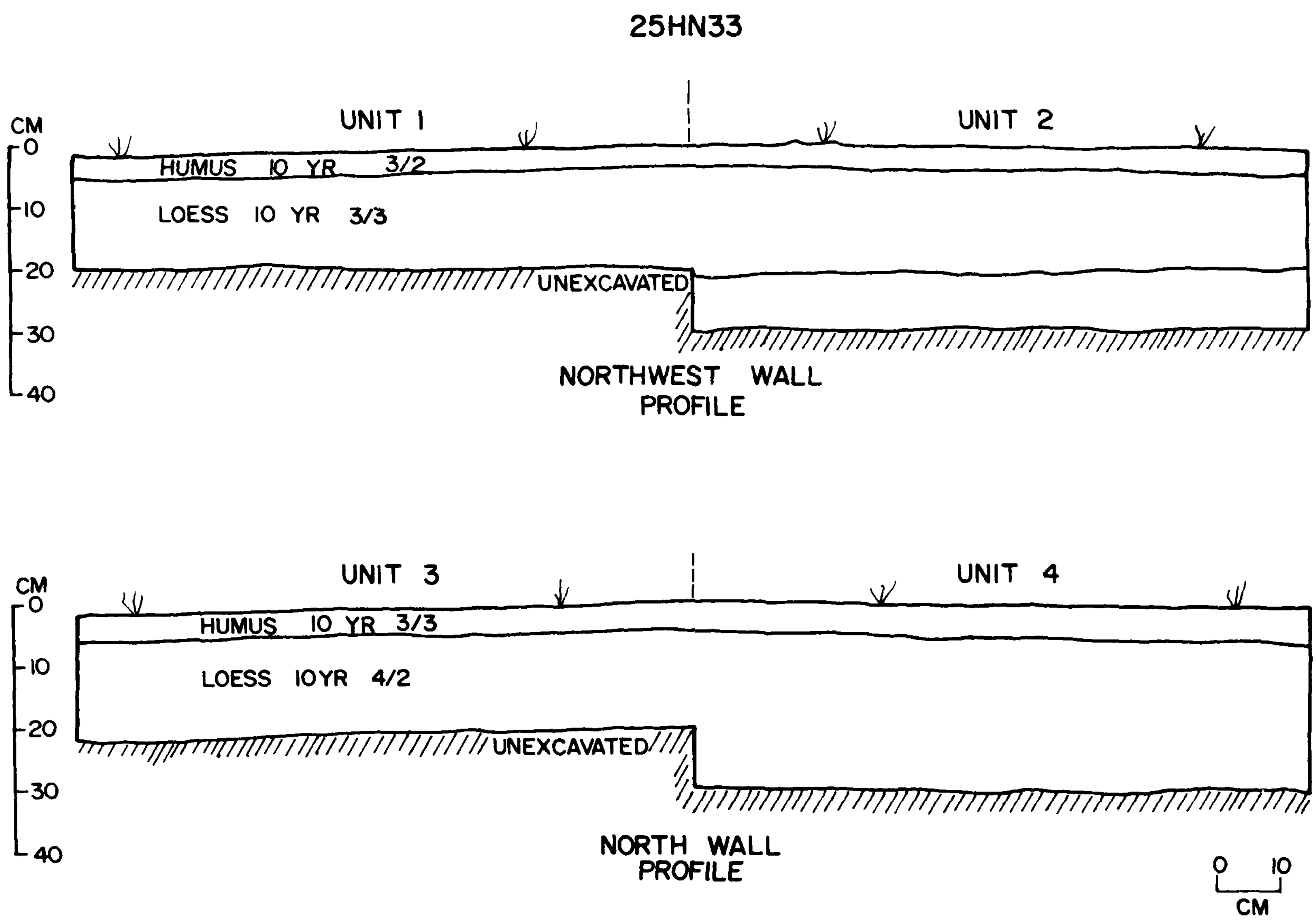


Figure 40. Profile of units 1, 2, 3, and 4 at site 25HN33.

25HN35

Figures	41 and 42
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	600 square meters (remaining)
Cultural Affiliation	Plains Woodland
Topographic Setting	Hill slope
Name	Unnamed
Drainage	Cook Creek
Surface Visibility	100 percent

Previous Research

No subsurface investigations have been conducted at the site by professional archaeologists. Surface collections consist of chipped stone fragments, ceramic fragments and shell specimens (Pepperl and Falk 1978:18).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units on a hill covered with grass and brush near the Corps of Engineers property boundary (Figs. 41 and 42). Manual excavations were conducted in arbitrary 10 cm levels. Unit 1 was dug to a depth of 30 cm and units 2, 3 and 4 were dug to a depth of 20 cm (Table 22). The only cultural remains were recovered from 0-10 cm in unit 4. There has been extensive erosion on the site. The majority of the site on private property is located in a severely eroded pig lot.

Interpretations

Because of severe erosion of the site and subsurface investigations being confined to Corps of Engineers property, onto which very little of the site extends, very little can be said about site interpretations. Previous researchers recovered Plains Woodland remains. No cultural remains were observed in the pig lot during the 1985 investigations. It is inferred that the site functioned as a seasonal hunting and gathering camp for Plains Woodland (Keith?) peoples.

Recommendations

Site 25HN35 has been severely eroded to the extent that virtually nothing remains of the site. Most of the site occurs on private property that is presently being used as a pig lot. Cultural remains on Corps of Engineers property are minimal and may be the result of erosion from higher ground. Investigations recovered a low frequency of cultural remains and no culturally diagnostic materials. There is no indication that the site is significant or warrants consideration for potential eligibility for nomination to the National Register of Historic Places.

Table 22

25HN35
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10						
10-20						
20-30						
Unit 2						
0-10						
10-20						
Unit 3						
0-10						
10-20						
Unit 4						
0-10	2					
Totals	2					

25HN35

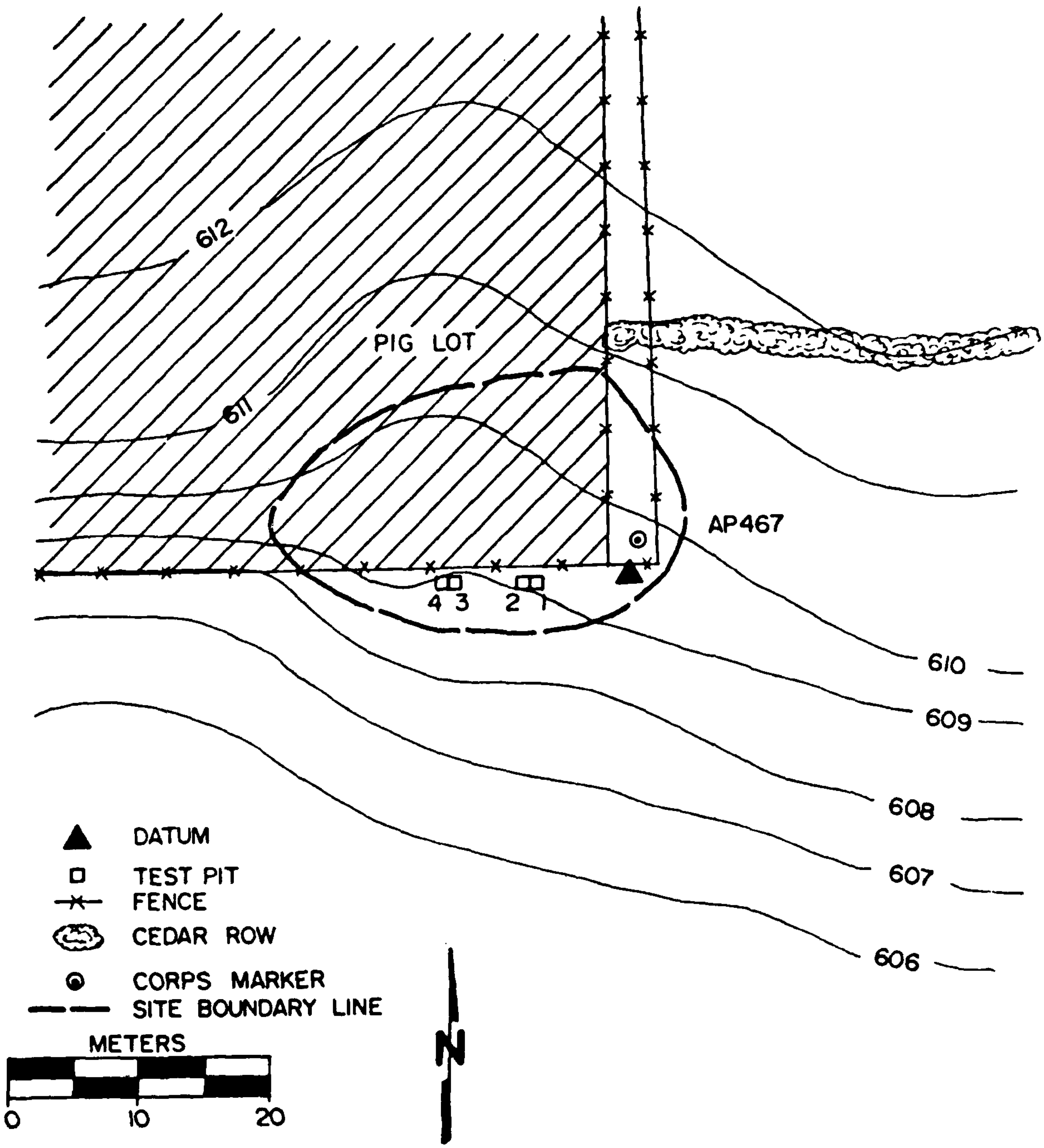


Figure 41 Site Map 25HN35

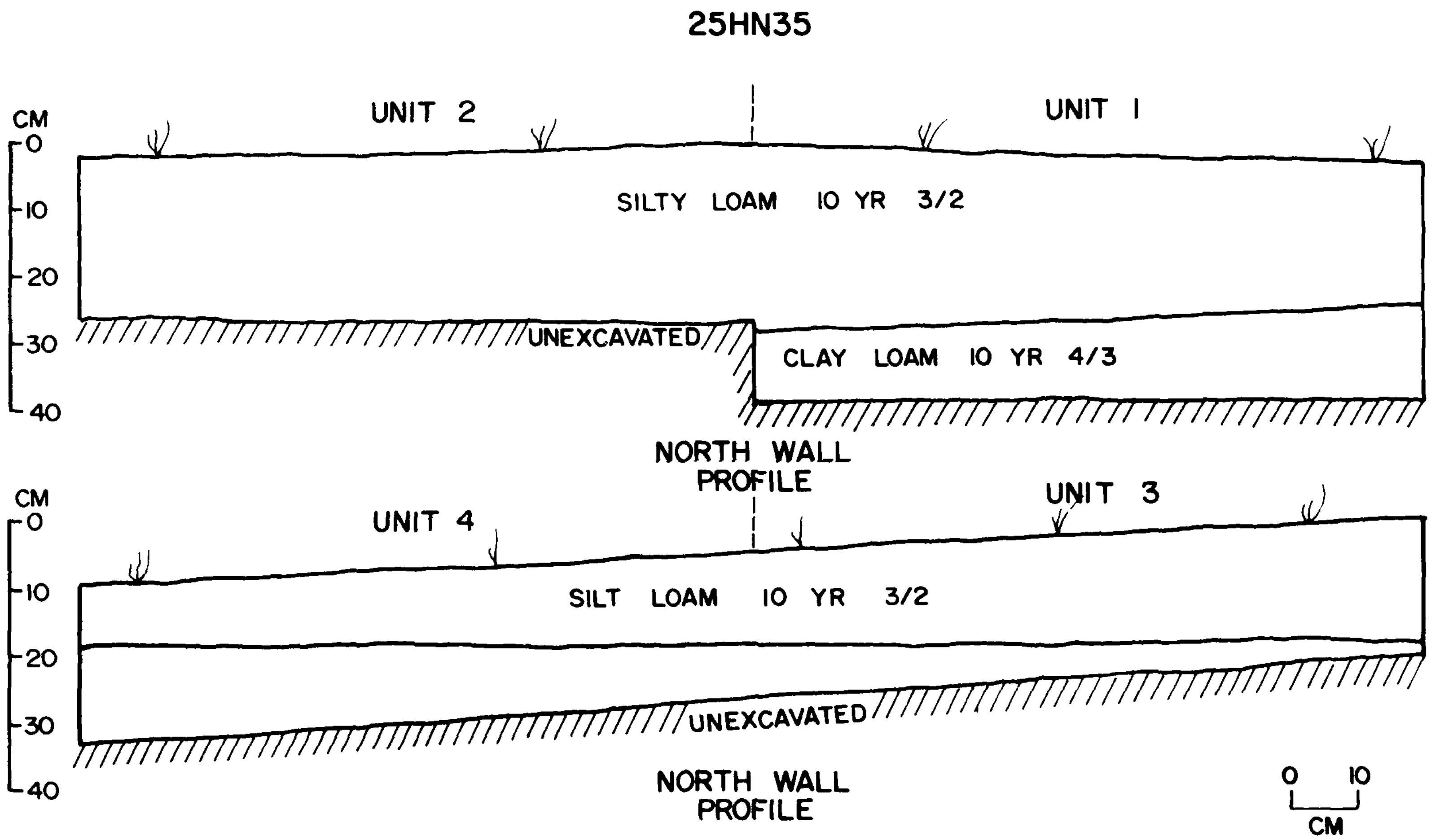


Figure 42. Profile of units 1, 2, 3, and 4 at site 25HN35.

25HN36

Figures	43 through 45
Plates	3 and 4
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	300 square meters (remaining)
Cultural Affiliation	Upper Republican
Topographic Setting	Hill slope
Name	Unnamed
Drainage	Republican River
Surface Visibility	25 percent

Previous Research

First recorded in 1946 by the River Basin Survey, this site was identified as an Upper Republican occupation situated on the end of a footslope point overlooking the Republican River (Plate 3). Two years later, the site was surface collected by field school students from the University of Nebraska, Lincoln. In 1950 it was the focus of "emergency survey and minor excavation ... by the Laboratory of Anthropology" (Champe 1951:6) when road crews began using portions of the site for fill dirt. In 1951 and 1952 major portions of the site were again investigated by the University of Nebraska, Lincoln, field school, which disclosed several house patterns and a midden area. The site was revisited by the Midwest Archeological Center in 1972 (Falk and Theissen 1972) at which time it appeared to be safe from destruction by the multipurpose pool level.

Champe (1951:6) described the site as existing within a terrace point between the country road and the river. The point was approximately 100 feet (33 meters) long and 50 feet (17 meters) wide and the cultural material could easily be observed in the road cut profile at about 15-18 inches (45 cm) below a light-colored aeolian soil (Plate 4). Several photographs on file at the University of Nebraska, Lincoln, clearly show the stratigraphy of the site in the early 1950's (Plate 4). The overburden was removed by heavy machinery during the 1950-1952 investigations, exposing the rich midden area. Excavations conducted at this time focused on the structural remains and recovered over 2,000 artifacts, which included fragments of human parietals that were painted red and burned.

In 1977, the size of the site was estimated to be about the same as recorded 27 years earlier (Pepperl and Falk 1978:19). Cultural material was observed along the site's northern margin close to the bluff edge, despite the heavy grass cover. The 1985 field investigations proposed in the research design focused on three aspects of the site: (1) the horizontal and vertical extent; (2) the identification of in situ deposits within specific area; and (3) the exact type of occupation (Adair and Brown 1985:35).

1985 Investigations

Investigations included manual excavation of one 1 X 2 meter unit and four 1 X 1 meter contiguous units (Figs. 43 through 45) that were in an L-shaped form. The site is bounded on the south by an abandoned road and on the north by a vertical cut bank. Examination of the cut bank did not reveal any visible cultural remains. Extensive erosion and the height of the cut bank may have obscured evidence of cultural remains. Manual excavations were conducted in arbitrary 10 cm levels. Units 1 and 2 were dug only to a depth of 10 cm because they were determined to be in an area of previous excavation. Few cultural remains were recovered from these units (Table 23). Units 3 and 4 were initially dug as a 1 X 2 meter pit. Because large quantities of cultural material were being recovered near the surface, this was expanded by establishing another 1 X 2 meter pit adjacent to units 3 and 4, forming an L-shaped excavation (Fig. 43).

Unit 3 was dug to a depth of 70 cm, unit 4 was dug to 40 cm, unit 5 was dug to 80 cm and unit 6 was dug to 40 cm (Table 23). Large quantities of lithics, ceramics (Tables 23 and 24) and fauna (Table 25) were recovered from these four units. The excavations yielded 602.5 grams of freshwater mussel shell. Human remains, consisting of two extremely worn molars of an aged individual and a slightly charred occipital fragment of an adult, were also found in the midden area. Worked bone consisted of three broken awls (Plate 1), a broken bead preform, a charred and cut section of a bison-size scapula exhibiting polish, a grooved-and-snapped fragment and an expediency tool. No complete bone tools were recovered from the midden area.

One charred seed, charcoal and several fresh seeds were identified from units 3 and 6 (Table 26). The charcoal consists primarily of very small fragments. Fresh seeds are represented by goosefoot (Chenopodium berlandieri), a common weedy annual found throughout the lake area. The single charred seed is a complete achene of sunflower (Helianthus annuus). Although distorted by carbonization, the seed measures 9.1 X 5.1 mm (reconstructed size) which places it within the range of the cultivated variety. This is the only cultigen recovered from any of the sites investigated.

There were no culturally sterile overlying soils but, rather, a continuous concentration of material from the present ground level to 70 cm below surface. It is believed, based on examination of photographs taken of the site in 1952 (Plate 4), that the overlying sterile loess was removed during those excavations. Consequently, the present profiles (Figs. 44 and 45) do not resemble the descriptions of the profile in 1950 and 1952. It is estimated that less than 300 square meters of the site remain. Because it is being severely eroded on the north by wave action, it will eventually be destroyed.

Interpretations

Site 25HN36 represents an Upper Republican hamlet that consisted of two or more earthlodges. The presence of a culturally sterile loess above the midden suggests a period of drought after abandonment of the site. This would coincide with the Pacific I climatic episode (see Chapter 3). The site represents a permanent or semi-permanent habitation that was probably occupied seasonally or year-round for several years by one or more extended families. The location of the site on a high hill slope suggests their agricultural fields were located below the site on the floodplain of the Republican River. The large quantities of lithics and ceramics indicate a variety of activities were conducted that included, but were not limited to, bone and wood working, cooking, butchering and hide working.

A large quantity and variety of fauna was recovered from the test units (Table 25). The faunal assemblage from the midden area is examined in detail in Chapter 10. The variety of fauna indicates a diffuse hunting and gathering subsistence economy. Both aquatic and grassland species are represented. The low frequency of bison may be due to the "schlepp" effect, which states that the larger the animal killed and the further from the point of consumption it is killed, the fewer of its bones will be brought back to the camp or village. The wide use available species, including freshwater mussel, may indicate the inhabitants were experiencing environmental stress. Whether this stress was due to climatic change is speculative, but the abandonment of the site with subsequent deposition of loess suggests a period of drought following its abandonment.

Recommendations

Site 25HN36 was extensively excavated in 1950-1952. Two Upper Republican earthlodges were excavated in addition to some of the midden. This material has never been systematically analyzed and published since its recovery. It is estimated that less than 150 square meters of the midden remain. The overlying culturally sterile loess was removed in 1950-1952. Because of advancements in excavation methods it would be very worthwhile to return to the site and excavate the remaining portion of the midden. The north edge of the site is being destroyed by shoreline erosion. In a few years there will not be any portion of the site remaining. Consequently, it is recommended that this site contains significant cultural remains that would help discern Upper Republican lifeways. Recovery of remaining cultural remains using state of the art excavation and analytical methods (e.g., soil flotation and water screening, pollen and opal phytolith analyses, etc.) would supplement materials previously excavated at the site in 1950-1952. It is also recommended that funds be provided for a complete analysis and publication of all excavated material from the site. In summary, the authors consider site 25HN36 scientifically significant and it is suggested that it be considered potentially eligible for nomination to the National Register of Historic Places.

Table 23

25HN36
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm	1		1			
Unit 2						
0-10 cm						
Unit 3						
0-10 cm	49		4	9	20	
10-20 cm	28	1	3	6	30	2
20-30 cm	26		1	9	12	1
30-40 cm	6			2	3	
40-50 cm	8		1		6	
50-60 cm	2			1	1	
60-70 cm	4				1	
Unit 4						
0-10 cm	45		1	5	25	
10-20 cm	30		2	7	32	
20-30 cm	21			3	11	
30-40 cm	7			2	6	
Unit 5						
0-10 cm	68		2	10	39	
10-20 cm	48		1	6	31	
20-30 cm	20		1	5	21	1
30-40 cm	9		1		2	
40-50 cm	15		1	5		
50-60 cm	7		1	2	3	
60-70 cm	5				2	
70-80 cm	1			2	1	1
Unit 6						
0-10 cm	58		9	9	35	
10-20 cm	43		4	6	23	
20-30 cm	35		2	5	11	
30-40 cm	31		1	7	10	
Totals	567	1	33	101	329	7
Surface	4		1			

Unit 4
0-10 cm 1 22 cal. long/long rifle case, "U SPEED"

Table 24

25HN36 Tools

artifact		unit/level	description
projectile point		3 /10-20 cm	small triangular shaped, biface, side notched, complete
		4 /10-20 cm	small triangular shaped, biface, side notched, complete
		4 /10-20 cm	small triangular shaped, biface, side notched, tip missing
		4 /30-40 cm	small triangular shaped, biface, notched, tip and base missing
		5/ 0-10 cm	small triangular shaped, biface, side notched, base missing
		5 /10-20 cm	small triangular shaped, biface, side notched, base missing
		6 /20-30 cm	small triangular shaped, biface, side notched, complete
point/knife		3 /10-20 cm	triangular shaped biface, tip and base missing
		5 / 0-10 cm	triangular shaped biface, base missing
	(3)	5 / 0-10 cm	triangular shaped biface, tip and base missing
		6 / 0-10 cm	triangular shaped biface, tip and base missing
knife		5 /40-50 cm	sub-triangular shaped, biface, tip missing

Table 24 cont.

end scraper		3 /20-30 cm	sub-triangular shaped, plano-convex, bit is uniface, hafting element is bifacial, complete
end scraper		5 /20-30 cm	sub-triangular shaped, plano-convex, uniface, complete
retouched flakes	(3)	3 / 0-10 cm	
	(5)	3 /10-20 cm	
		3 /20-30 cm	
		3 /30-40 cm	
		3 /40-50 cm	
		4 /10-20 cm	
		4 /20-30 cm	
		5 / 0-10 cm	
		5 /10-20 cm	
		5 /30-40 cm	
grooved abrader		3 /20-30 cm	sandstone, grooved abrader, sub-rectangular shaped, incomplete
.22 cal. long rifle		4 / 0-10 cm	brass shell, "U SPEED"
sandstone			37.9 grams total
limestone			29.6 grams total
green quartzite			5.1 grams total
charcoal			9.5 grams total
hematite			22.5 grams total
burned earth			7.7 grams total
miscellaneous rock			3.2 grams total

Table 25

Taxonomic Composition of Vertebrate Remains From Site 25HN36 (see Appendix B for Provenience)

Taxon	common name	NISP	MNI
OSTEICHTHYES (NISP=55)	Bony Fish		
Acipenseridae	Sturgeons		
cf. *Scaphirhynchus platorynchus*	?shovel-nosed sturgeon	1	1
Lepisosteidae	Gars		
Lepisosteus sp.	Gar	2	1
Ictaluridae	Catfishes		
Ictalurus punctatus	Channel Catfish	2	1
Ictalurus sp.	Catfish	16	3
Unidentified fish		34	-
AMPHIBIA (NISP=1)	Amphibians		
Ranidae	Frogs	1	1
REPTILIA (NISP=267)	Reptiles		
Chelydridae	Snapping Turtles		
Chelydra serpentina	Northern Snapping Turtle	6	1
cf. *Chelydra serpentina*	?Northern Snapping Turtle	4	1
Kinosternidae	Musk and Mud Turtles		
Kinosternon flavescens	Plains Yellow Mud Turtle	2	1
cf. *Kinosternon flavescens*	Plains Yellow Mud Turtle	1	1
Emydidae	Freshwater and Marsh Turtles		
Terrapene ornata	Ornate Box Turtle	28	4
Chrysemys picta	Western Painted Turtle	11	1

Table 25 cont.

taxon	common name	NISP	MNI
Trionychidae	Softshell Turtles		
Trionyx muticus	Midland Smooth Softshell Turtle	2	2
Trionyx sp.	Softshell Turtle	33	3
Unidentified turtle		167	-
Colubridae	Non-venomous Snakes		
Elaphe obsoleta	Black Rat Snake	12	1
cf. *Elaphe obsoleta*	Black Rat Snake	1	-
AVES (NISP=49)	Birds		
Anatidae	Swans, Geese, Ducks		
Branta canadensis	Canada Goose	2	1
cf. *Chen caerulescens*	?Snow Goose	1	1
cf. *Anas acuta*	?Pintail	7	2
Anas discors	Blue-winged Teal	1	1
Anas clypeata	Northern Shoveler	2	2
cf. *Anas clypeata*	?Northern Shoveler	1	-
Anas sp.	Duck	4	-
Lophodytes cucullatus	Hooded Merganser	1	1
cf. *Lophodytes cucullatus*	?Hooded Merganser	1	-
Accipitridae	Hawks, Eagles		
Buteo lagopus	Rough-legged Hawk	1	1
cf. *Buteo lagopus*	?Rough-legged Hawk	1	-
Tetraonidae	Grouse, Ptarmigan		
Pedioecetes phasianellus	Sharp-tailed Grouse	1	1

Table 25 cont.

taxon	common name	NISP	MNI
Rallidae	Rails, Coots, Gallinules,		
Fulica americana	American Coot	1	1
Passeriformes	Perching Birds	1	1
Unidentified bird		24	-
MAMMALIA (NISP=397)	Mammals		
Leporidae	Hares, Rabbits		
Sylvilagus sp.	Cottontail	115	8
Lepus sp.	Jack Rabbit	17	2
cf. *Lepus* sp.	?Jack Rabbit	2	-
Sciuridae	Squirrels		
Spermophilus tridecemlineatus	13-line Ground Squirrel	1	1
Cynomys ludovicianus	Black-tailed Prairie Dog	4	2
Geomyidae	Pocket Gophers		
Geomys bursarius	Plains Pocket Gopher	19	2
Castoridae	Beavers		
Castor canadensis	Beaver	16	1
Cricetidae	New World Rats and Mice		
Microtus ochrogaster	Prairie Vole	7	4
cf. *Ondatra zibethicus*	?Muskrat	1	1
Unidentified rodent		4	-
Canidae	Wolves, Coyotes, Dogs, Foxes		
Canis latrans	Coyote	2	1
Canis cf. *latrans*	?Coyote	15	-
Vulpes velox	Swift Fox	4	1
Procyonidae	Procyonids		
Procyon lotor	Raccoon	2	1
Raccoon-size		11	-
Cervidae	Wapiti, Deer		
Odocoileus sp.	Deer	38	1

Table 25 cont.

taxon	common name	NISP	MNI
Antilocapridae	Pronghorn		
Antilocapra americana	Pronghorn	20	1
Deer or Pronghorn		53	-
Deer-size		60	-
Bovidae	Bison, Cows		
Bison bison	Bison	4	1
Wapiti or Bison		2	-
Indeterminate mammal (N=1585)			
TOTAL		769	61

Table 26

Identified Flora From 25HN36

unit	level	taxon	common	amount
3	20-30	*Helianthus annuus*	sunflower	1
			charcoal	>1 g
6	10-20	*Chenopodium berlandieri*	goosefoot	2*
			charcoal	>1 g

* fresh seed

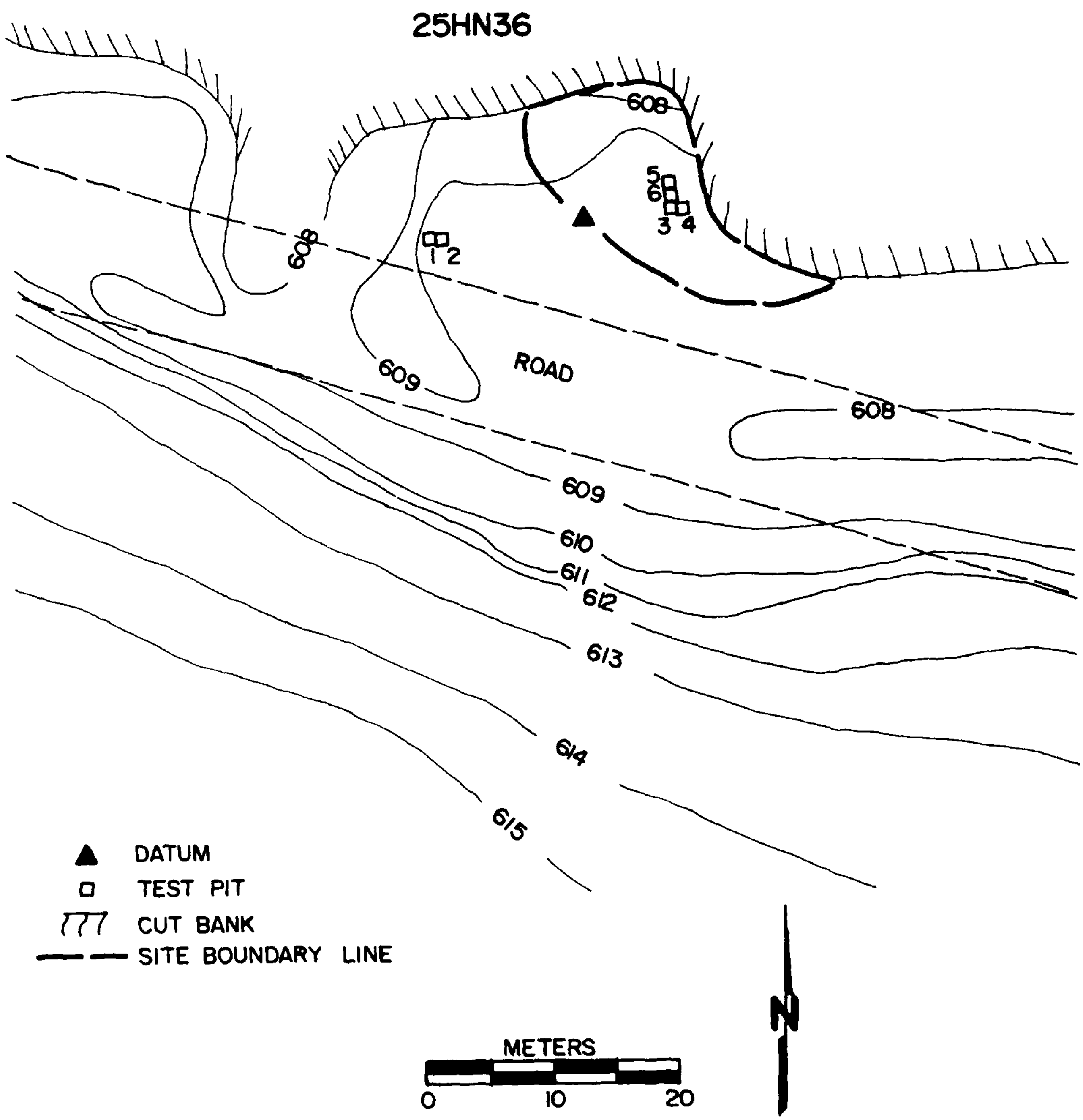


Figure 43. Site map of 25HN36.

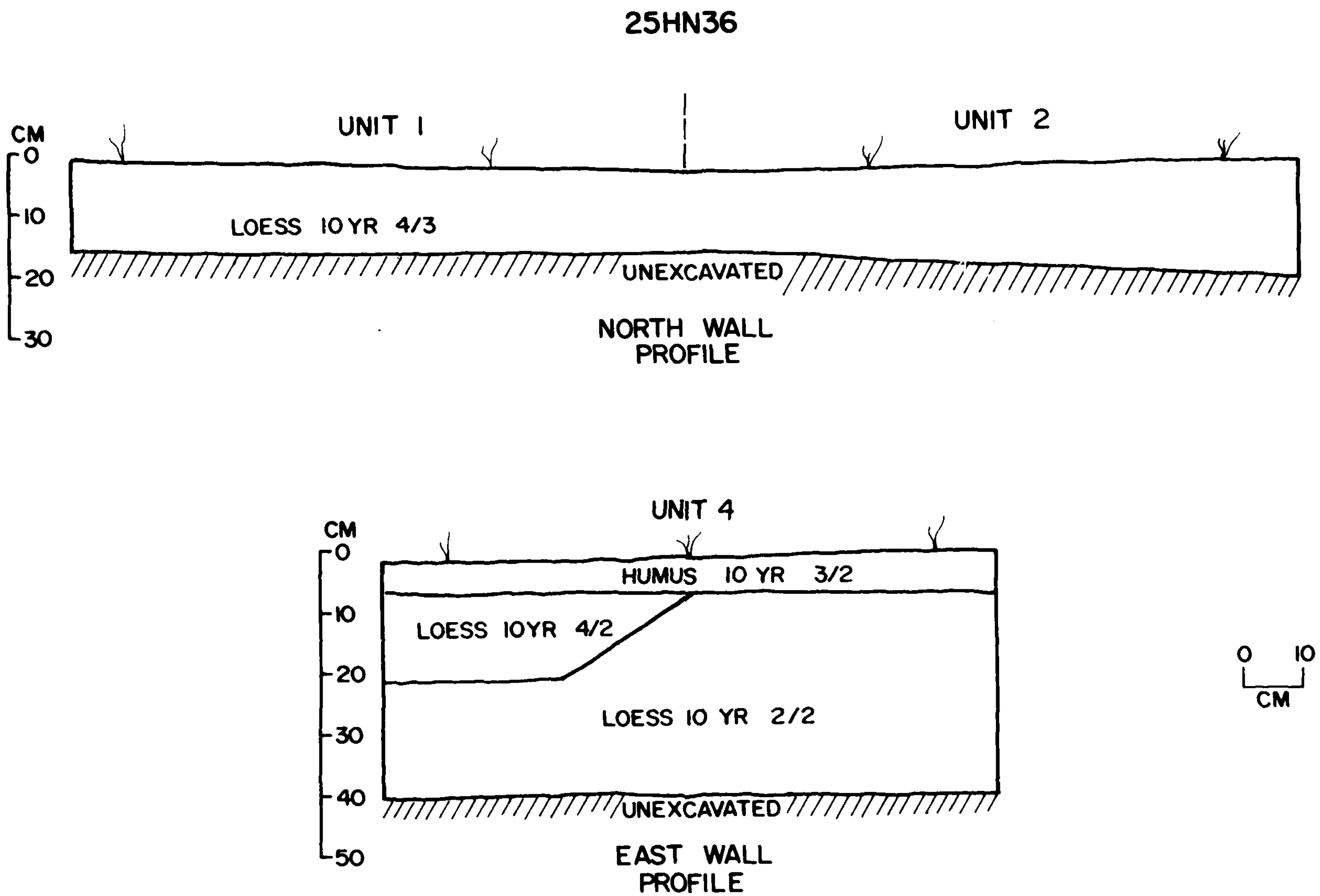


Figure 44. Profile of the north wall of excavation units 1 and 2 and the east wall of excavation unit 4 at site 25HN36.

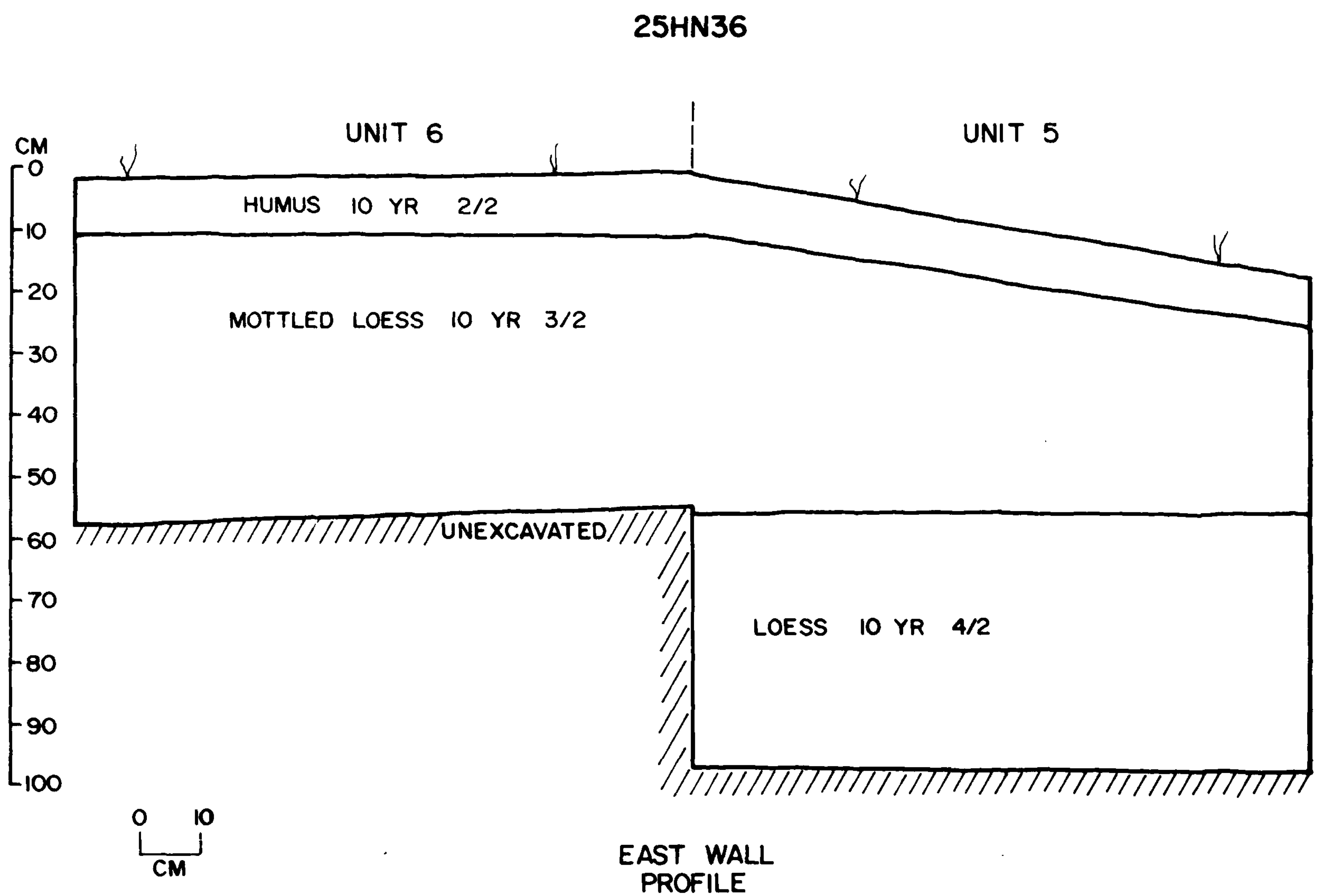


Figure 45. Profile of the east wall of excavation units 5 and 6 at site 25HN36.

Plate 3. Aerial view of 25HN36, showing the location of the 1952 excavations. Photo courtesy of the Department of Anthropology, University of Nebraska, Lincoln.

Plate 4. Early photographs of 25HN36, showing (top) the location of the site in relation to the road cut, and (bottom) a close-up view of the stratigraphy showing the depth of the light colored sterile overburden removed during the 1950-1952 excavations. Photos courtesy of the Department of Anthropology, University of Nebraska, Lincoln.

25HN37

Figures	46 through 49
Plates	5, 6, and 7
Site Type	Village
Recorded	1946, River Basin Surveys
Size	9,000 square meters (remaining)
Cultural Affiliation	Dismal River (Plains Apache)
Topographic Setting	Terrace
Name	White Cat Village
Drainage	Prairie Dog Creek
Surface Visibility	10 to 100 percent

Previous Research

Described in 1972 (Falk and Thiessen 1972:22) as a unique and important site, White Cat Village (25HN37) has been the focus of at least nine seasons of investigations by professional archaeologists. The site was, however, well known to local collectors prior to any professional investigation (Kivett 1947b). White Cat Village is located near the edge of a high terrace point extending into the Prairie Dog Creek Valley (Fig. 46, Plate 5). It was first recorded by the River Basin Survey in 1946 and subsurface tested later that season (Kivett 1947b). Between 1948 and 1952 crews from the University of Nebraska, Lincoln, spent the summer months conducting major excavations at the site. Heavy machinery was used to remove overburden and expose evidence of four structures in one area of the site (Plate 6); additional trenching disclosed four additional house floors, over 200 features were identified, including a large roasting pit; and well over 10,000 artifacts were inventoried. These data were analyzed and used to define the Dismal River aspect of southcentral Nebraska (Gunnerson 1960, 1968), a proto-historic Plains Apache manifestation.

Diagnostic artifacts include a five-post house foundation markedly different from the common Plains earthlodge; large baking or roasting pits that resemble features from post-Spanish levels at Pecos pueblo in New Mexico; thin, hard and dark ceramic vessels often tempered with mica and exhibiting little decoration; and an abundance of stone and bone tools that establish the Dismal River subsistence economy as one of primarily hunting and gathering, only limitedly supplemented by agriculture. Several items, including turquoise beads and pendants, obsidian flakes and tools, glaze-paint decorated pottery sherds, and *Olivella* shell beads clearly indicate contact and probable trade with Puebloan people on the Rio Grande (Wedel 1986:144). The recovery of an iron axehead from a feature at White Cat Village also provides evidence of contact with Euro-Americans. A charred center post from one of the house structures has provided a date of A.D. 1723, based on dendrochronology, further substantiating a post-European occupation of the site.

White Cat Village was revisited in 1972 by the Midwest Archeological Survey (Falk and Thiessen 1972) and was recommended for bank stabilization measures. In 1973, over 270 artifacts were collected from the surface of the site by local amateurs and in 1979 a series of small shovel tests and auger tests were excavated on the existing shoreline and above the cut bank (Roetzel et al. 1982). This latter investigation was unsuccessful in identifying any remaining intact portions of the site; however, previous post-reservoir investigations suggest that cultural deposits, including possible intact structures, still remain. With this dilemma in mind, the 1985 excavations understandably focused mainly on locating possible undisturbed areas of the site.

James Gunnerson (Professor, Department of Anthropology, University of Nebraska, Lincoln, personal communication, 1986) states that an overall site map was made in the field by a member of Donald Lehmer's crew in 1952 but the site map was lost in transit from Harlan County to Lincoln, Nebraska. Therefore, because previous investigators used different site grids for each area excavated (e.g., houses), there is no way to tie all of the excavations together into a cohesive site map to show the spatial relationship between features. Artifacts excavated by Donald Lehmer in 1952 have never been analyzed or written up.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter and two 1 X 1 meter units (Fig. 46). The south edge of the site is being destroyed by shoreline erosion as evidenced by large quantities of chipped stone, pottery and faunal remains on the beach (Tables 27 through 29). Examination of the 1.2 meter high cut bank (Fig. 49) resulted in finding a small baking pit eroding out (Fig. 48, Plate 7). Near the baking pit was a recent refuse pit containing metal cans and plastic containers. The baking pit, Feature 1, had approximately 25 cm of culturally sterile overburden (Fig. 48).

Manual excavations were done in arbitrary 10 cm levels. Unit 1, which contained the baking pit, was dug to a depth of 30 cm, with the feature extending from 25 cm to 39 cm below ground surface. The feature was cross-sectioned and all soils were saved for water flotation and screening. On top of the feature was a small triangular arrow point and some pottery sherds (Tables 27 and 28). The feature fill contained primarily burned earth. Units 2 and 6 were dug to a depth of 30 cm, unit 3 was dug to 30 cm and units 4 and 5 were dug to 20 cm. With the exception of the feature, cultural material occurs only to a depth of 20 cm to 30 cm. The remaining portion of the site appears to have been cultivated in the past (e.g., plow zone of 20 cm) but it is presently mostly in grass, brush and trees.

James Gunnerson (Professor, Department of Anthropology, University of Nebraska, Lincoln, personal communication 1986) reported the existence of a food cellar on the bank of the terrace on which White Cat Village occurs. He reported a block cistern also was located as much as 200 feet (70 meters) from the edge of the terrace and food cellar. At present the cistern is visible near the present edge of the terrace during low water in Harlan County Lake. This indicates shoreline erosion has destroyed approximately 200 feet (70 meters) of the southernmost portion of White Cat Village. Examination of pre-lake photographs of White Cat Village (Plate 6) indicate previous investigations were near the edge of the terrace prior to the filling of the lake. Based upon this evidence, it is believed that the northern portion of White Cat Village remains intact. The dashed line in Plate 5 designates the approximate location of the present cut bank. The excavation of an in situ baking pit (Feature 1) during present investigations substantiates the existence of in situ cultural features.

Interpretations

White Cat Village (25HN37) was occupied by Plains Apache at approximately A.D. 1723. These people were probably chronicled by early Spanish explorers in the region. The village consisted of a small number of lodges with the characteristic five support post pattern of the Dismal River complex. The village was a permanent or semi-permanent residence for a relatively large number of families. The variety of cultural remains indicate a wide variety of tasks were conducted that included, but were not limited to, agriculture, hunting, butchering, hide working, wood, bone and shell working and cooking. The presence of Euro-American trade items recovered from previous investigations indicate contact with Euro-American traders and/or other local tribes who acted as inter-mediaries between the Apache and Euro-American traders.

Most of the faunal remains (Table 29) were recovered from the beach. The fish remains were recovered from the 0-10 cm level of a 1 X 2 meter unit located near the edge of the cut bank and are are believed to be intrusive from recent fishermen. Previous investigations at the site did not recover any fish associated with cultural remains (Gunnerson 1960). Most fauna recovered are large forms such as bison, horse, wapiti, deer and canids. A total of 9.7 grams of freshwater mussel shells were collected from the excavations and beach. Despite the identification of a large baking pit, the recovered botanical remains from 25HN37 are disappointing (Table 30). Wood charcoal was located in both the feature and from unit 1 although the pieces are very small fragments. One fresh seed of smartweed (Polygonum pensylvanicum) was also identified from unit 1. Because artifacts recovered from the 1952 excavations have never been analyzed or written up, a more complete reconstruction of the site is not possible at this time.

Recommendations

Extensive excavations have been conducted at White Cat Village (25HN37). Some of the artifacts have never been analyzed or written up. Present investigations indicate the northernmost portion of the site is still relatively undisturbed and in situ features are present. The southernmost portion of the site has been destroyed by shoreline erosion. The destroyed area is where all previous investigations were conducted. Because of the size of the site, the quantity of artifacts and cultural features (e.g., houses, pits, hearths), the authors consider the site to contain cultural remains that are scientifically significant. It is recommended that funds be provided to systematically analyze the data from previous investigations and to submitt a written report on the results of the analyses. It is also imperative that either substantial excavations be conducted and/or the 1.2 meter high cut bank be stablized to prevent further destruction of the remaining portion of the site due to shoreline erosion. The authors recommend the site warrants consideration for eligibility for nomination to the National Register of Historic Places.

Table 27

25HN37
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm	2			1	1	
10-20 cm	24			3	20	
20-30 cm	1				7	
Feature 1 (25-39) cm					3	
Unit 2						
0-10 cm	7					
10-20 cm	7				1	
20-30 cm	2			1		
Unit 3						
0-10 cm	9			1	4	
10-20 cm	7				5	
20-30 cm						
30-40 cm						
Unit 4						
0-10 cm	3			1	4	
10-20 cm	1					
Unit 5						
0-10 cm					2	
10-20 cm	1					
Unit 6						
0-10 cm						
10-20 cm						
20-30 cm						
Totals	64			7	47	
Surface	618	6	6	220	219	12

Beach 1 nail fragment, 1 eating fork fragment, 3 pieces of metal

Table 28

25HN37 Tools

artifact	unit/level	description
projectile point	beach	small triangular shaped, biface, side notched, tip and base missing
	beach	small triangular shaped, biface, side notched, tip missing
	beach	small triangular shaped, biface, notched?, base missing
	beach	small triangular shaped, biface, side notched, blade missing
	(2) beach	small triangular shaped, biface, side notched, tip missing
	1 /10-20 cm	small triangular shaped, biface, side notched, complete
point/knife	beach	triangular shaped biface, base missing
	beach	triangular shaped biface, tip and base missing
	Feature 1	triangular shaped biface, complete
end scraper	(7) beach	sub-triangular shaped, plano-convex uniface, complete
	(1) beach	sub-triangular shaped, plano-convex uniface, base missing
	6 / 0-10 cm	sub-triangular shaped, plano-convex uniface, tip and base missing

Table 28 cont.

artifact		unit/level	description
side scraper		beach	sub-rectangular shaped, uniface, plano-convex, tip and base missing
side scraper		beach	sub-rectangular shaped, uniface, plano-convex, tip missing
disto-lateral scraper		beach	sub-rectangular shaped, uniface, plano-convex, tip missing
		beach	sub-rectangular shaped, uniface, plano-convex, base missing
denticulate	(2)	beach	sub-rectangular shaped, uniface, complete
chopper		beach	ovoid shaped, biface, base missing
end scraper/notch		beach	sub-triangular shaped, uniface, plano-convex, complete
drill		beach	triangular shaped biface, tip missing
retouched flakes	(3)	beach	
sandstone grooved abrader	(2)	beach	sub-rectangular shaped, grooved on one face
groundstone	(3)	beach	fragments of smoothed granite and/or quartzite
burned earth			37.7 grams total
charcoal			12.6 grams (not including C-14 sample)
limestone			14.8 grams total
metal, iron		beach	3.0 grams total
metal eating knife		beach	
nail fragment		beach	
white piece of plastic			0.1 grams

Table 29

Taxonomic Composition of Vertebrate Remains From Site 25HN37 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
OSTEICHTHYES (NISP=5)	Bony Fish		
Sciaenidae	Drums		
Aplodinotus grunniens	Freshwater drum	1	1
Unidentified fish		4	-
MAMMALIA (NISP=49)	Mammals		
Canidae	Wolves, Coyotes, Dogs, Foxes		
Canis familiaris or C. lupus	Dog or gray wolf	1	1
Equidae	Horses		
Equus caballus	Domestic horse	1	1
Cervidae	Wapiti, Deer		
Cervus canadensis	Wapiti	3	1
Odocoileus sp.	Deer	1	1
Indeterminate cervid		1	-
Bovidae	Bos, Bison		
Bison bison	Bison	23	2
Wapiti or Bison		19	-
Indeterminate mammal (N=189)		-	-
TOTAL		54	7

Table 30

Identified Flora From 25HN37

unit	level	taxon	common	amount
Feature 1			charcoal	62 g
1	10-20		charcoal	>1 g
		Polygonum pensylvanicum	smartweed	1*

* fresh seed

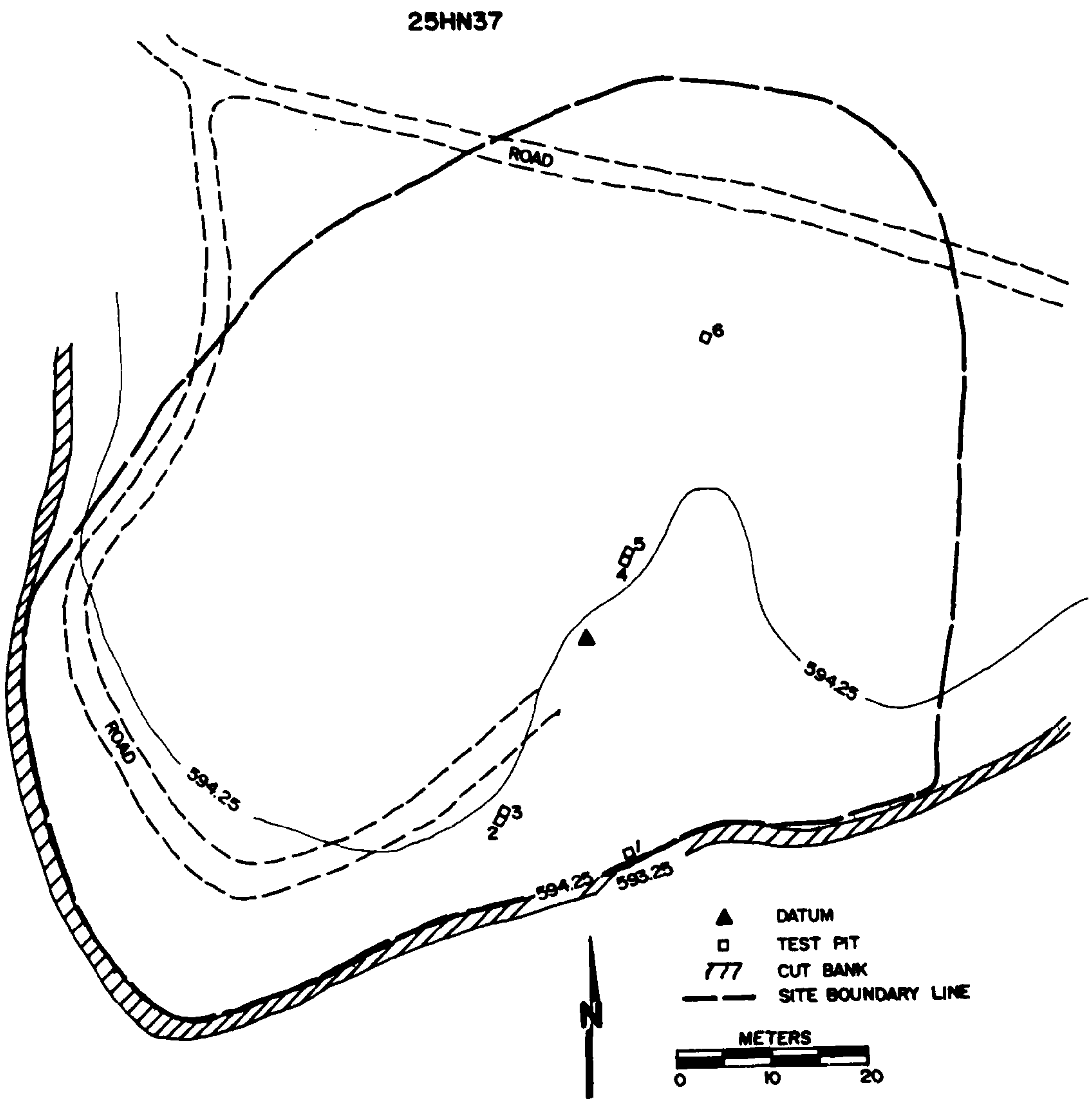


Figure 46. Site map of White Cat Village, 25HN37.

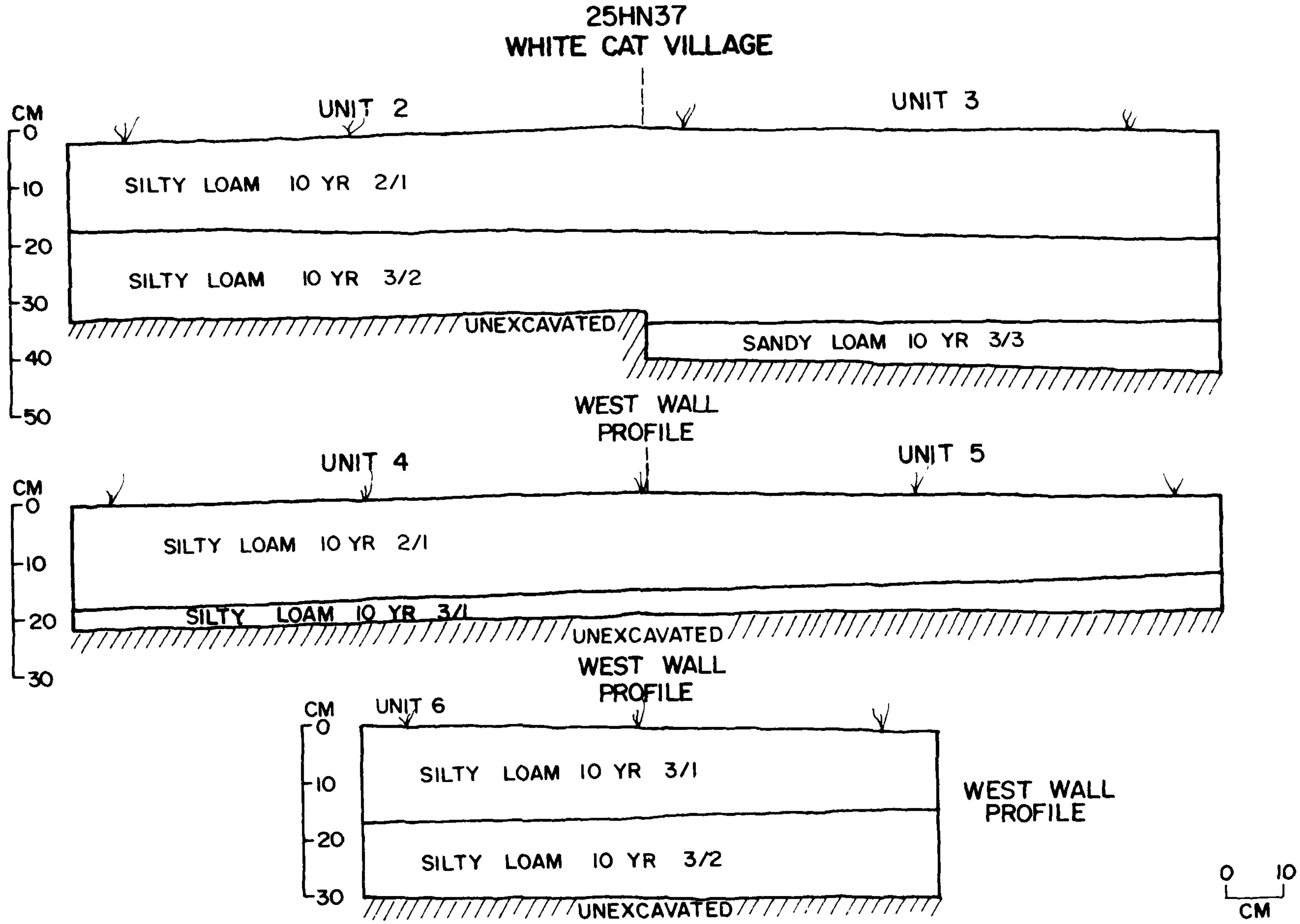


Figure 47. Profile of excavation units 2, 3, 4, 5, and 6 at site 25HN37.

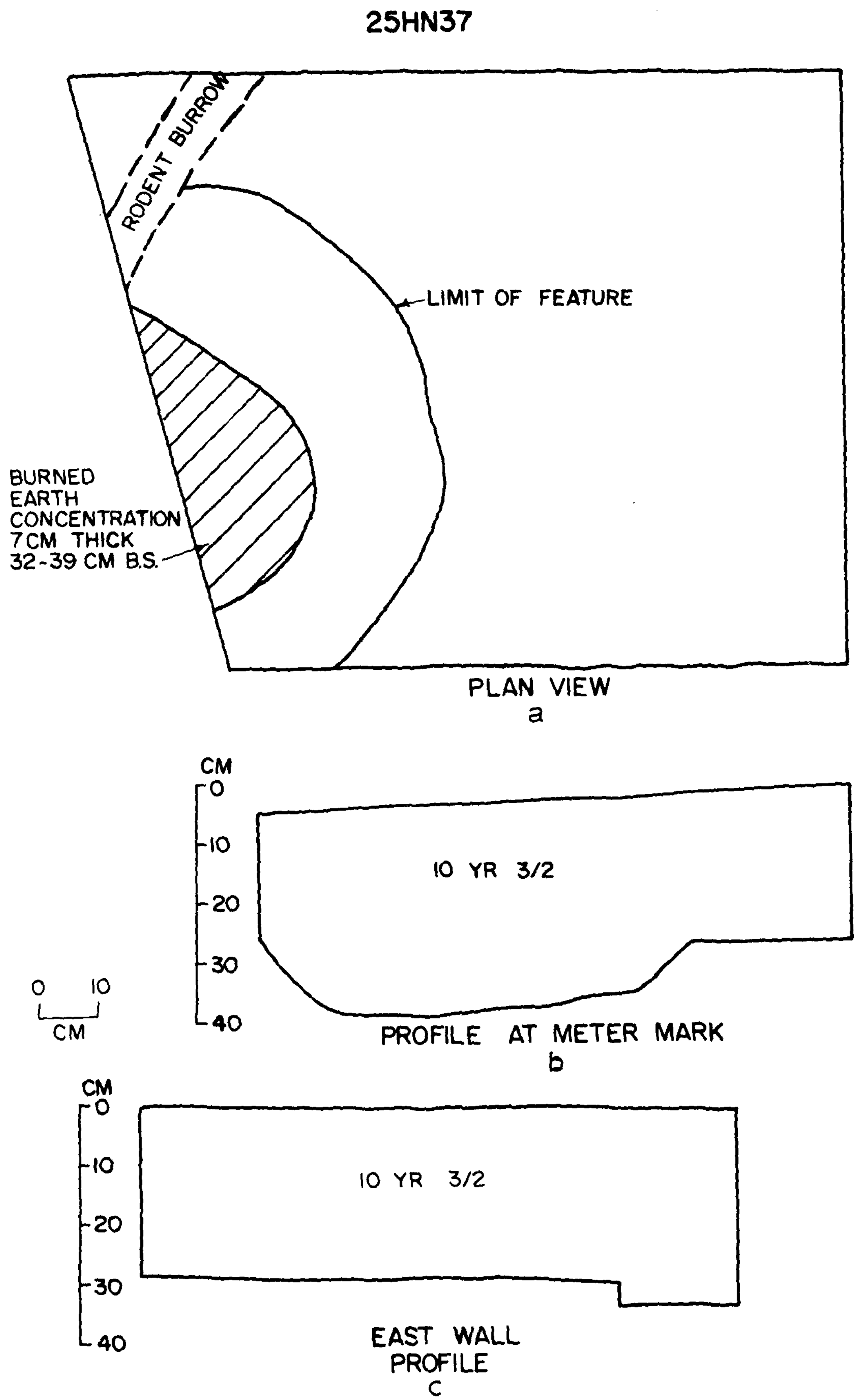


Figure 48. a) plan view of unit 1 showing the feature 1;
b) profile of unit 1 along cut bank;
c) profile of unit 1.

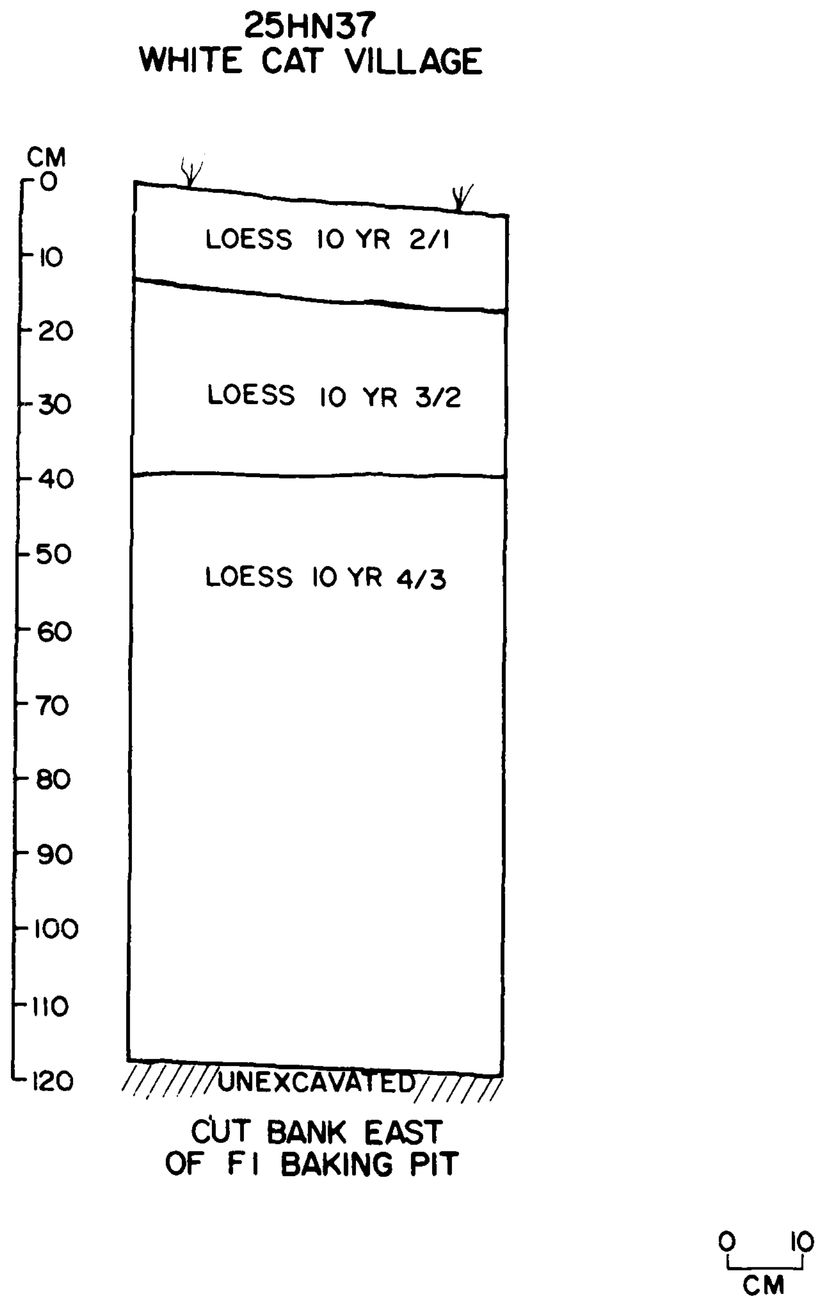


Figure 49. Profile of the south wall of the cut bank at site 25HN37.

Plate 3. Aerial view of White Cat Village (25HN37), showing the location of previous excavations and the approximate location of the present day shoreline (dashed line). Photo courtesy of the Nebraska State Historical Society.

Plate 7. White Cat Village (25HN37), Feature 1. (top), profile of feature in cut bank, and (bottom) excavated feature at 23 cm below surface.

25HN38

Figures	50 and 51
Site Type	Habitation
Recorded	1946, River Basin Surveys
Size	6,400 square meters
Cultural Affiliation	Plains Woodland
Topographic Setting	Terrace
Name	Unnamed
Drainage	Prairie Dog Creek
Surface Visibility	50 to 100 percent

Previous Research

This site was also recorded and initially tested in 1946 by the River Basin Survey. It was described by Kivett (1947b:36-37) as covering a small area on a high terrace of Prairie Dog Creek. Surface debris included flint chips, pottery sherds, animal bones, and some stone artifacts. An unrecorded number of test units were placed along the terrace top and excavated to a depth varying from 14-16 inches (36-39 cm). One small feature was uncovered, yielding "wattle fragments" (Kivett 1947b:36), charcoal, pottery, debitage and bone fragments. The cord-marked ceramics were indicative of a Woodland occupation. Because the cultural material was confined to the top 20 cm, Kivett (1947b:37) suggested that most of the site had been plowed and eroded down the slope into an old creek channel. When the site was revisited 26 years later, it appeared to be in relatively little danger of destruction (Falk and Theissen 1972:22). Based on the 1977 investigations, the site was described as a small concentration of artifacts located on a small rounded point at the terrace edge, corresponding roughly to the same area outlined by 1946 (Pepperl and Falk 1978:22). Since the exact nature of the site remained somewhat unclear, the 1985 investigations were outlined to focus on the extent and density of deposits (Adair and Brown 1985:37).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units (Fig. 50). The site, which is in cultivation, has a plow zone that is 20 cm deep. Units 1 and 2 were placed in the cultivated field and were dug to a depth of 30 cm and 25 cm, respectively. Units 3 and 4 were placed in a small grassed area at the edge of the cultivated field were dug in arbitrary 10 cm levels to a depth of 30 cm and 20 cm, respectively. All artifacts were recovered from the uppermost 20 cm (Tables 31 and 32). Cultural remains appear to be contained entirely within the plow- zone. A short, five meter long trench was excavated to a depth of

200 cm at the east edge of the site along the terrace slope (Fig. 50). There was no evidence of deeply buried cultural horizons.

Interpretations

Site 25HN38 appears to have been a seasonally occupied hunting and gathering campsite of Plains Woodland peoples. The thin surface scatter of artifacts and lack of a midden (e.g., cultural remains below plow zone) suggests the site was not intensively used. Because of the absence of more substantial cultural remains, more specific interpretations are not possible.

Recommendations

Cultural remains at site 25HN38 are confined to the plow zone. Subsurface features that have been truncated by modern agricutural practices may be present but this has not been substantiated.. The low frequency of cultural materials and absence of in situ remains does not make this site significant. The authors recommend that this site does not warrant consideration for eligibility for nomination to the National Register of Historic Places.

Table 31

25HN38
Artifacts

Unit 1	flakes	blades	potlids	shatter	sherds	historic
0-20 cm						
20-30 cm						
Unit 2						
0-20 cm	1					
20-25 cm						
Unit 3						
0-10 cm	4			1		
10-20 cm	4			1		
20-30 cm						
Unit 4						
0-10 cm	6					
10-20 cm						
Totals	15			2		
Surface	75	4	1	46		1 metal

Table 32

25HN38 Tools

artifact		unit/level	description
knife		surface	triangular shaped biface, base missing
biface resharpening flake		4 / 0-10 cm	complete
core	(4)	surface	complete
retouched flakes	(2)	surface	
quartzite mano		surface	incomplete
sheet metal		surface	1.4 grams total

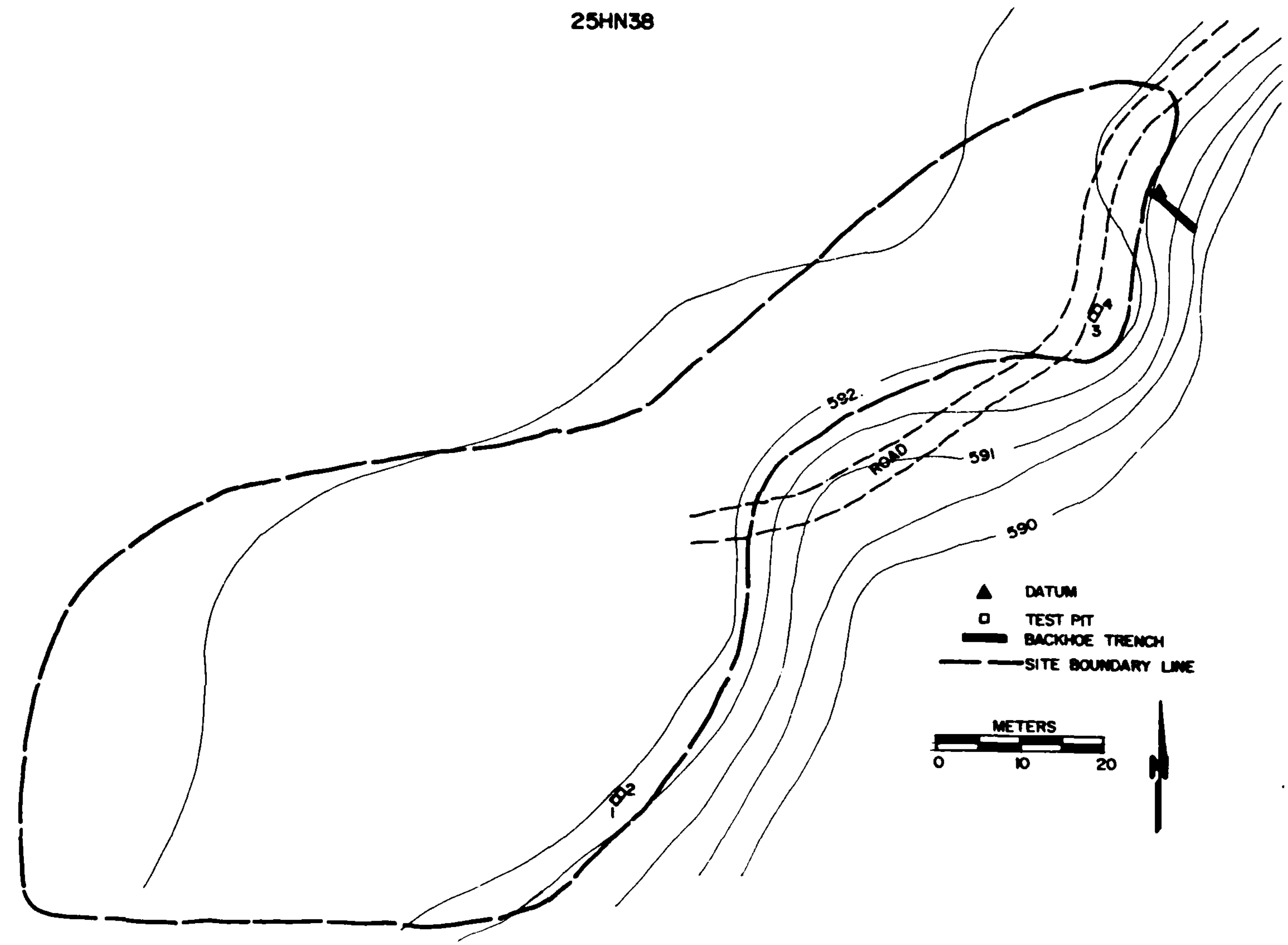


Figure 50. Site map of 25HN38.

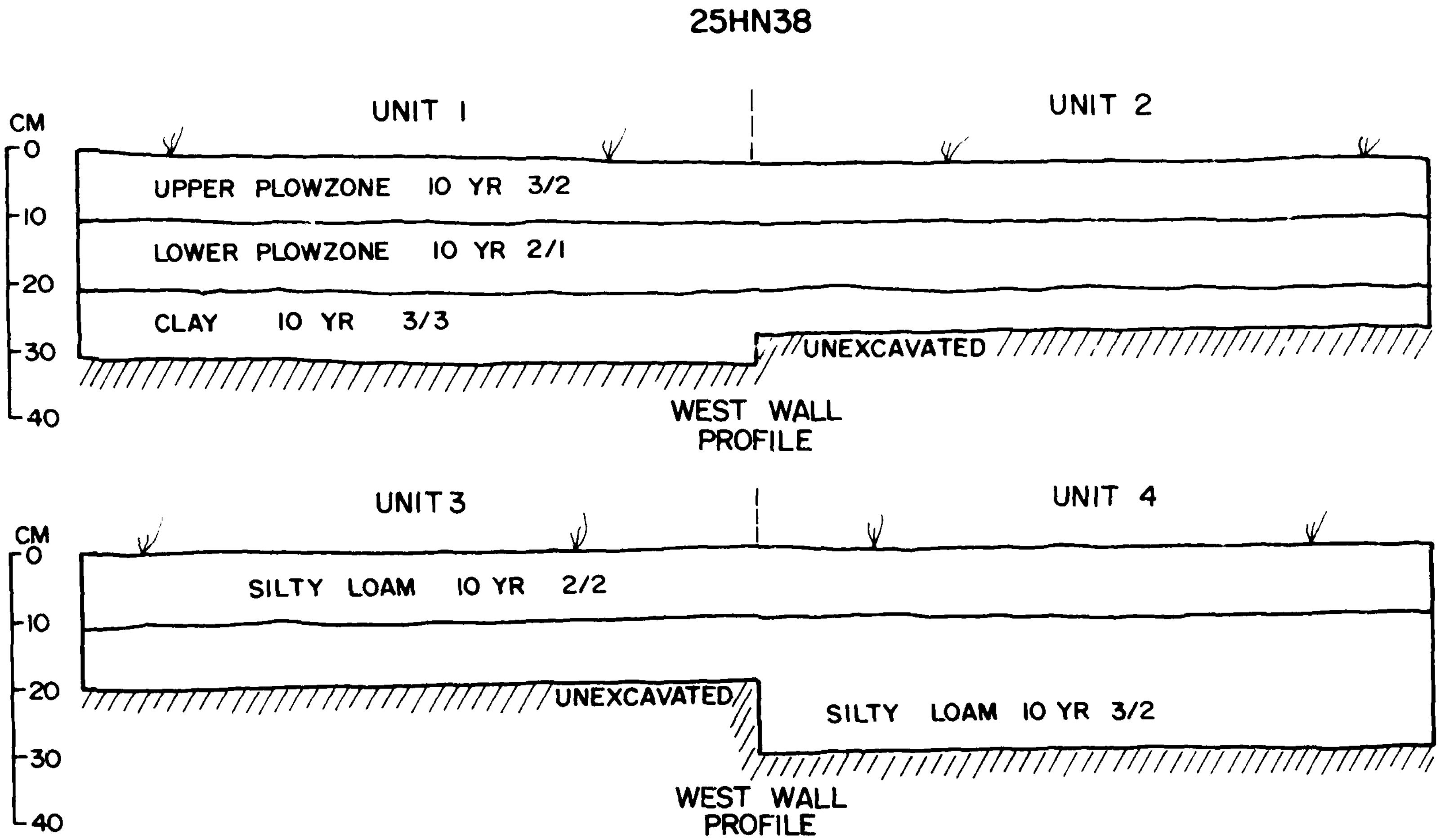


Figure 51. Profile of the west wall of units 1, 2, 3, and 4 at site 25HN38.

25HN39

Figures	52 through 54
Site Type	Camp
Recorded	1946, River Basin Surveys
Size	2,500 squre meters (remaining)
Cultural Affiliation	White Rock aspect, Blue Stone focus
Topographic Setting	Terrace
Name	Green Plum Site
Drainage	Prairie Dog Creek
Surface Visibility	10 percent

Previous Research

Surface collections, test pits, and trench excavations were conducted at this site during the same investigation that originally recorded the site in 1946. The site is located on a low terrace of Prairie Dog Creek, approximately 200 meters southeast of 25HN38, and was described in 1977 as being covered with heavy vegetation (Pepperl and Falk 1978).

The 1946 investigations uncovered four trash pits, three burnt areas, and two small midden areas that were identified by the dark stained soil and abundance of artifacts. Excavations were continued in 1950 by the University of Nebraska, Lincoln, field school in areas marked by a high density of surface materials. A total of 27 features were identified, providing ample data for the recognition of a new taxonomic unit, the Blue Stone focus of the White Rock aspect (Rusco 1960).

The Midwest Archeological Survey of 1977 stated that the entire terrace area was under dense vegetation and, therefore, the site was not intensively surveyed. No cultural materials were found in the cleared spots. In 1985, an initial measure was the removal of heavy vegetation so that test excavation units could be placed on the site area.

1985 Investigations

Investigations consisted of manual excavation of one 1 X 2 meter unit, one 2 X 2 meter unit and a backhoe trench (Figs. 52 through 54). All manual excavations were in arbitrary 10 cm levels. Units 1 through 4 were dug to a depth of 40 cm and units 5 and 6 were dug to 30 cm. Almost all artifacts were recovered from the uppermost 30 cm (Table 33). A complete, sub-triangular shaped, plano-convex, end scraper was recovered from unit 4 at a depth of 10-20 cm. Retouched flakes (one each) were recovered from unit 4 at a depth of 10-20 cm and unit 6 at a depth of 0-10 cm. Pieces of quartzite and limestone recovered from test excavations total 284.3 grams and 17.5 grams, respectively. A total of

18 bone fragments, including two of deer (<u>Odocoileus</u> sp.) and one of bison or wapiti, were recovered. Several excavation units yielded fresh seeds from 25HN39 (Table 34). No wood charcoal or charred seeds were recovered. The fresh seeds included goosefoot (<u>Chenopodium berlandieri</u>), carpetweed (<u>Mullugo verticillata</u>), pigweed (<u>Amaranthus sp</u>.) and unidentified grasses. All of these species are common to a prairie/grassland area and the seeds of these annuals can easily penetrate the soil and enter an archaeological deposit.

Excavations encountered a soft yellowish soil at a depth of 20 cm that was devoid of cultural remains. This is probably the sterile soil mentioned during investigations at the site in 1950 (Champe 1951; Nebraska site file). The backhoe trench, which was dug to a depth of 130 cm, was in an area of continuous alluvium (Fig. 54). No evidence of deeply buried cultural horizons was observed. Because the site is inundated during normal pool level in the spring, the shallow water table did not permit the backhoe trench to be dug to a greater depth.

Interpretations

Previous investigations at the site indicate a semi-permanent or permanent village occupied by peoples with a cultural inventory (e.g., ceramics, lithics) similar to that of the Oneota peoples located further east. Early researchers assigned this site to the White Rock aspect. Some authors (O'Brien 1984) suggest the White Rock aspect is an extension of the historic Kansa into the region. There is debate as to the proper placement of the White Rock aspect. The absence of significant cultural remains recovered during the present investigation does not lend help in regard to this issue.

Recommendations

Site 25HN39 is periodically inundated by waters impounded by Harlan County Dam. Test excavations in 1985 did not reveal the presence of in situ cultural remains. The 1977 survey appears to have been inadequate for determining the presence of cultural remains. Based upon the low frequency of artifacts recovered in 1985, the authors do not consider the site to contain significant scientific cultural remains. Consequently, the site is not recommended for consideration of eligibility for nomination to the National Register of Historic Places.

Table 33

25HN39
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm						
10-20 cm	4	1				
20-30 cm				1		
30-40 cm						
Unit 2						
0-10 cm						
10-20 cm	1					
20-30 cm						
30-40 cm						
Unit 3						
0-10 cm	6			1	5	
10-20 cm	10			6	18	
20-30 cm	4			1	3	
30-40 cm						
Unit 4						
0-10 cm	9			1	2	
10-20 cm	9	1		1	9	
20-30 cm	4				8	1
30-40 cm					2	
Unit 5						
0-10 cm	3			2	7	
10-20 cm						
20-30 cm					1	
Unit 6						
0-10 cm	21	1	1	8	16	
10-20 cm						
20-30 cm						
Totals	71	3	1	21	71	1

Table 34

Identified Flora From 25HN39

unit	level	taxon	common	amount
2	10-20	Chenopodium berlandieri	goosefoot	55*
		Mullugo verticillata	carpetweed	2*
2	20-30	gramineae	unidentified grass	1*
4	10-20	Chenopodium berlandieri	goosefoot	160*
		Mullugo verticillata	carpetweed	72*
		Amaranthus sp.	pigweed	50*
4	30-40	Chenopodium berlandieri	goosefoot	2*
		gramineae	unidentified grass	1*

* fresh seed

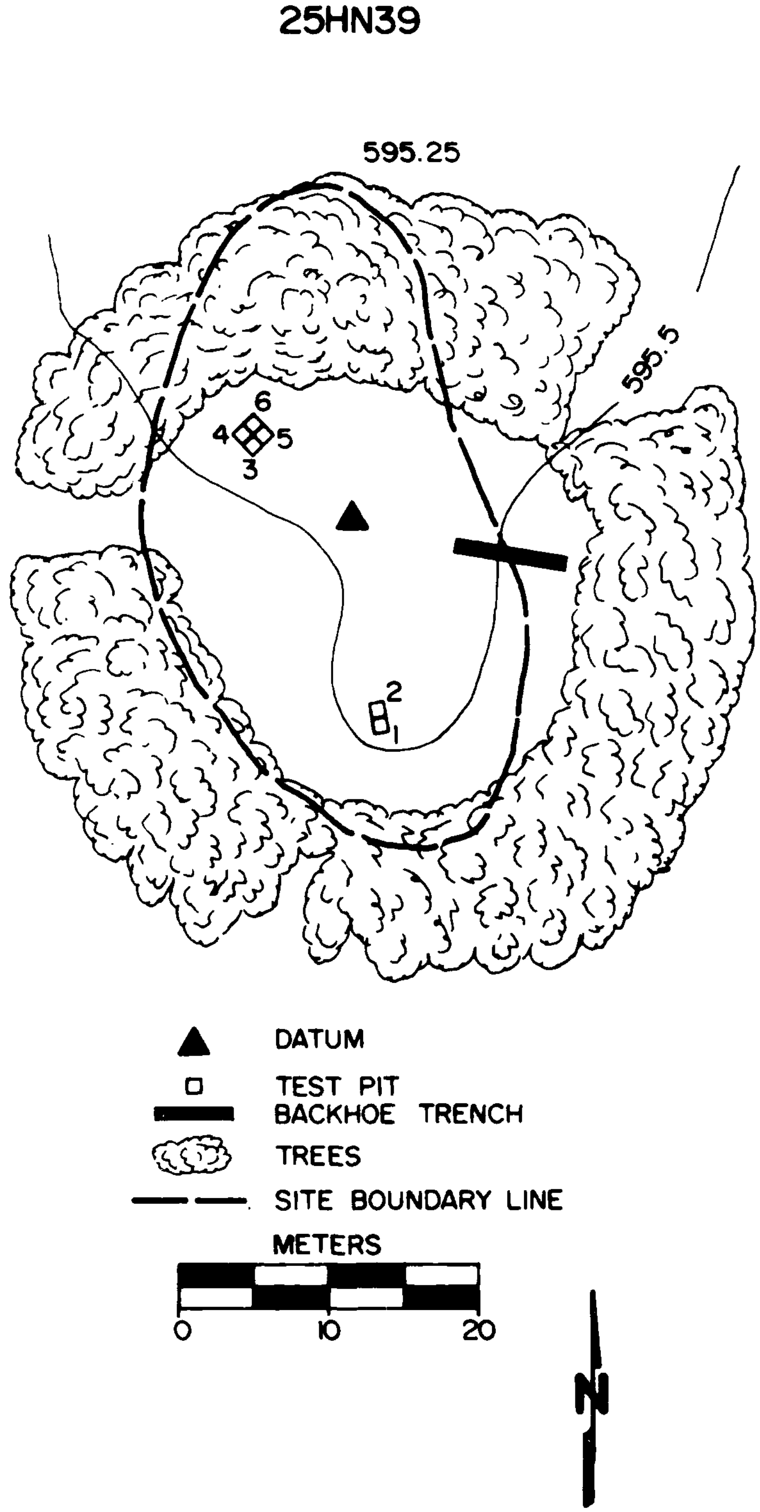


Figure 52. Site map of the Green Plum site, 25HN39.

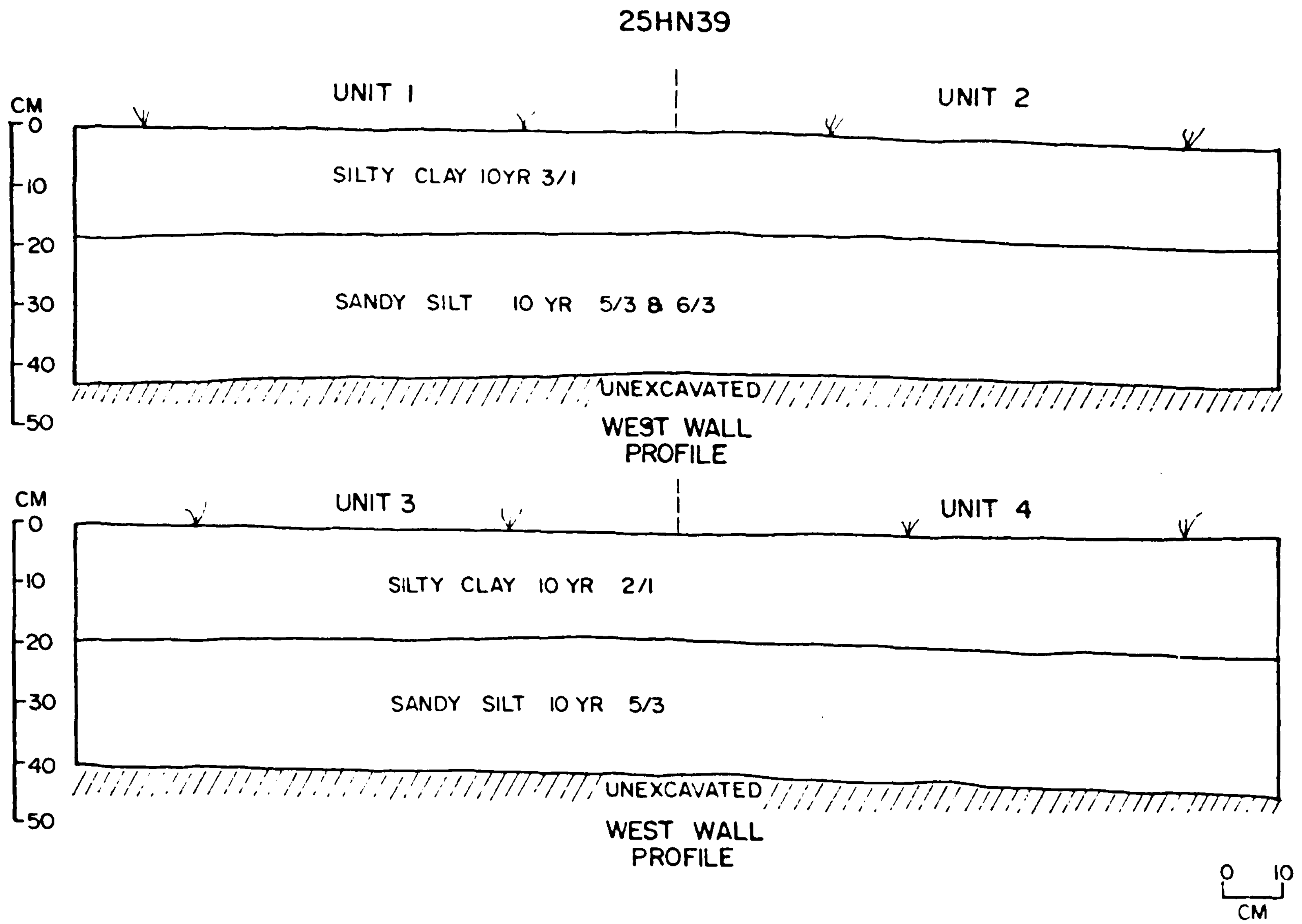


Figure 53 Profile of the west wall of excavation units 1, 2, 3, and 4, 25HN39

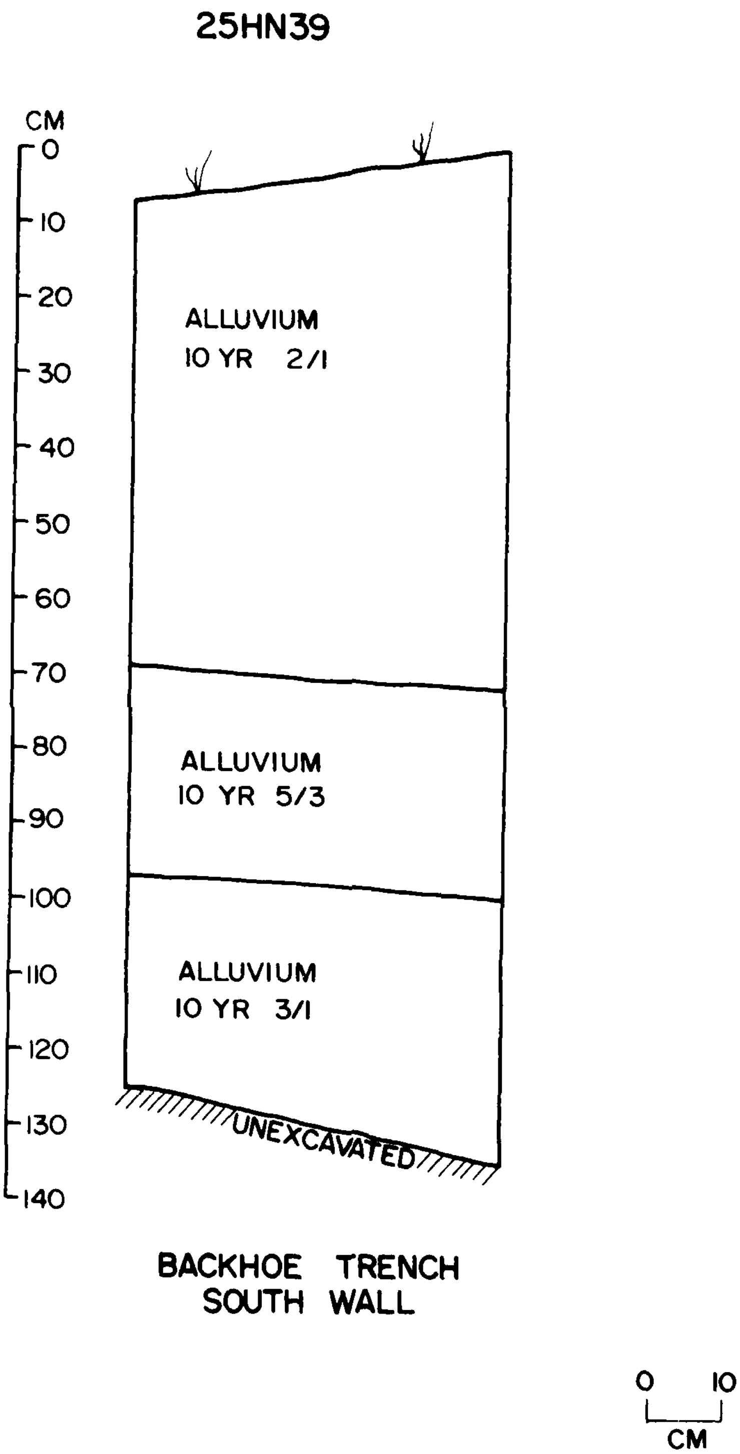


Figure 54. Profile of the south wall of the backhoe trench at site 25HN39.

25HN40

Figures	55 through 60
Plates	1 and 8
Site Type	Habitation
Recorded	1946, River Basin Survey
Size	6,500 square meters
Cultural Affiliation	Keith complex
Topographic Setting	Terrace
Name	Unnamed
Drainage	Methodist Creek
Surface Visibility	50 percent

Previous Research

Located on a high terrace above the former Methodist Creek channel, this site was first recorded and tested in 1946 by the River Basin Survey. Cultural material, including lithics, ceramics and shell fragments, extended to a depth of 8 inches (20 cm) below surface and extended over an area of about 200 feet (65 meters) (University of Nebraska, Lincoln, site files).

In 1972, the site was described by the Midwest Archeological Center as being located in a grassy field and not endangered of destruction by the reservoir. Subsurface transect investigations conducted in 1977 (Pepperl and Falk 1978) and 1980 (Roetzel et al. 1982) yielded density figures for artifacts on the beach and on the overlooking cut bank. Pepperl and Falk (1978:24) state that the density of artifacts on the beach was nearly ten times greater than the density for other investigated beach areas. Roetzel et al. (1982:92), however, state that the artifact density was "relatively low", although there were areas of definite concentrations. Furthermore, they suggest that at least a portion of the site remains intact. Investigations conducted in 1985 were oriented around delineating intact areas of the site.

In December 1980 and November 1981 personnel from the U.S. Army Corps of Engineers conducted salvage excavations at two burial sites within the Harlan County Lake area. Site 25HN118 is located along the western shsore of Methodist Cove and was originally reported by Roetzel (1982:46) as a habitation site with the burials of at least three individuals. Site 25HN174 was observed in 1981 along a vertical cut bank of Harlan County Lake located on the east side of Methodist Cove. It is located approximately one-half mile southeast of site 25HN118. At both sites, the human remains were shallowly buried and were eroding rapidly. The primary purposes of both excavations were to determine the nature of the osteological materials and to remove the individuals present.

Three adult females and one juvenile were represented in the osteological material recovered from 25HN118. Two bone awls, two bifaces and three freshwater mussel shells were also recovered. All material was located within a small area to a maximum depth of 20 cm. below surface. No feature, such as a mound or burial pit, was discernible. Analyses of mortuary practices of the Plains Woodland period led investigators to suggest 25HN118 was culturally affiliated with the Valley complex (Tibesar et al. 1984).

The remains of a single male were recovered from 25HN174. Located approximately 40 cm below ground surface, the individual did not appear to have been interred within a burial pit. No artifacts were associated with the burial although a radiocarbon date of A.D. 300.110 suggests a Late Archaic-Early Woodland affiliation. Tibesar et al. (1984:134-135) suggest that the burial practices of site 25HN174 are characteristic of the Archaic burial mode.

Site 25HN40 does not appear to be associated with the burials at 25HN118. In terms of actual location, the two sites are on opposite shores of Methodist Cove. No mention is made of "Burial B" of site 25HN118 in any report on the excavations and it is assumed that this term refers to one of the three individuals recovered from the site. Therefore, burial B would have the same provenience location as site 25HN118. The cultural relationship between the Keith complex Woodland occupation at 25HN40 and the suggested Valley complex affiliation of the burials at 25HN118 may be problematic. The stylistic expression observed in the ceramics and in the projectile points suggests that the Keith and Valley complexes may be related, the extent of which is unknown. Burial practices, however, are known to differ with Keith complex burials represented primarily by ossuaries, such as the Woodruff ossuary (14PH4). Without a clearly defined feature (e.g., mound, burial pit), diagnostic artifacts and radiocarbon assays, the cultural relationship between 25HN118 and 25HN40 cannot be established. Based upon current data, 25HN118 appears to be culturally associated with the Valley complex (Tibesar et al. 1984).

The relationship between the single burial at 25HN174 and 25HN40 may also be questioned from a provenience and from a cultural perspective. Both sites are located on the east shore of Methodist Cove in close proximity to the mouth of the cove (Tibesar et al. 1984:50). The exact location of 25HN174, however, could not be determined from existing documentation; however it appears to be fairly close to the site limits defined for 25HN40 (Fig. 55). The burial is described as being located along a vertical cut bank and such a cut bank defines the eastern and southern limits of 25HN40. While previous investigations (Pepperl and Falk 1978; Roetzel et al. 1982) noted cultural materials along the beach adjacent to the cut bank, the 1985 field investigations did expose cultural materials or buried cultural horizons within the cut bank examined. In addition, test units 3 and 4 were placed close to the edge of the cut bank and no human osteological remains were encountered. Furthermore, a radiocarbon date of A.D. 350 from 25HN174 clearly negates any cultural relationship between this burial and the Woodland occupation that was the focus of this investigation.

Remains associated with this occupation are confined mainly to the uppermost 30 cm with features extending to approximately 80 cm below surface. The burial is described as existing about 40 cm below surface (field notes on file, personal communication Mary Lucido, U.S. Army Corps of Engineers, Kansas City District). Therefore, if additional burials were present, the field techniques employed in this investigation were more than adequate to expose the remains. The single burial at 25HN174 appears to have predated the Woodland occupation at 25HN40 and is, therefore, not culturally associated.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units and examination of the cut bank on the south edge of the site (Figs. 55 through 60). The cut bank was profiled to a depth of 210 cm (Fig. 60). There was no evidence of deeply buried cultural horizons. Manual excavations were done in arbitrary 10 cm levels. Units 1 and 4 were dug to a depth of 40 cm and units 2 and 3 were dug to 30 cm (Table 35). Most artifacts were recovered from the uppermost 30 cm (Tables 35 and 36). Excavations in units 1 and 2 revealed an in situ trash-filled storage pit (Figs. 57 and 58, Plate 8). The pit, feature 1, measured 100 cm by 80 cm in diameter and from 40 cm to 80 cm below surface (Fig. 58).

The feature contained some faunal material, such as pronghorn (*Antilocapra americana*) (Table 37). A single pronghorn element, the naviculo-cuboid, exhibits cut marks, possibly resulting from skinning or disarticulating the hind leg. A total of 22.3 grams of mussel shells were recovered from the excavations. Like the botanical remains from site 25HN37 and 25HN39, the plant remains recovered from 25HN40 consisted primarily of fresh seeds (Table 38). Sunflower

(_Helianthus annuus_), goosefoot (_Chenopodium berlandieri_) and pigweed (_Amaranthus_) are present in units 1 and 3, along with small amounts of wood charcoal. Wood charcoal was also identified from feature 1.

Units 3 and 4 revealed several possible post stains (Fig. 59). Most of the stains were rodent burrows but others were indeterminate. Based on the test excavations and examination of the cut bank, cultural remains occur in the uppermost 30 cm, with in situ features present below plow zone. Although the site is presently in brush and small timber, a distinct plow zone was delineated at a depth of 15 cm to 20 cm (Fig. 56). Consequently, in situ cultural remains are present at the site.

A perforated mussel shell fragment, possibly a bead (Plate 1), was recovered from the 10-20 cm level of unit 1. Its surfaces are eroded. This artifact is asymmetrical in outline, measuring 17.4 mm in maximum length, 13.7 mm in maximum width, and 3.7 mm thick. It is perforated by a 1.7 mm diameter hole that was only drilled from one direction.

A large quantity of lithic artifacts (Tables 35 and 36) were recovered from the test excavations and from the beach. The pottery sherds, Harlan Cord-Roughened, are indicative of the Keith complex. The projectile points (Table 36) also fit within the styles associated with the Keith complex.

Interpretations

Site 25HN40 represents a small village or semi-permanent camp used by Plains Woodland peoples (Keith complex). The variety of artifact types recovered from the surface and test excavations, in addition to an in situ trash filled storage pit, indicate the site was intensively used for a short period of time. Tasks performed at the site include hunting, butchering, hide working, cooking and stone, bone and wood working. Although only a few faunal remains were recovered (Table 37, Appendix B) from the test excavations, bone preservation appears to be very good.

Recommendations

Site 25HN40 contains in situ cultural remains below plow zone. Cultural remains include partially intact features. The general lack of knowledge regarding the Plains Woodland period in the High Plains underscores the scientific importance of this site. The authors, therefore, recommend the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 35

25HN40
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-10 cm	40			8	2	
10-20 cm	72	3	4	6	1	
20-30 cm	37			7		
30-40 cm	20		1	2	1	
Unit 2						
0-10 cm	57		2	10	1	
10-20 cm	32	1	3	6		
20-30 cm	45		1	1	2	
Unit 3						
0-10 cm	33			10		
10-20 cm	14			6		
20-30 cm	3					
Unit 4						
0-10 cm	22		1	7		
10-20 cm	18			3		
20-30 cm	6			1		
30-40 cm	2					
Feature 1	11	1		3		
Totals	412	5	12	70	7	
Surface	102		1	22	1	

Table 36

25HN40 Tools

artifact		unit/level	description
projectile point		beach	small triangular shaped, multi-paired side notched biface, tip missing
		beach	small triangular shaped, side notched, biface complete
point/knives		surface	leaf-shaped, unnotched, biface, tip missing
		surface	triangular shaped biface, unnotched, tip missing
		beach	triangular shaped biface, tip and base missing
knife		2 / 0-10 cm	triangular shaped biface, base missing
end scraper		surface	sub-triangular shaped, uniface, plano-convex, complete
uniface resharpening flake		beach	complete
retouched flakes	(1)	beach	
	(1)	surface	
burned earth			40.6 grams total
charcoal			4.6 grams
limestone			117.5 grams
sandstone			199.4 grams
Feature 1 limestone			40.1 grams

Table 37

Taxonomic Composition of Vertebrate Remains From Site 25HN40 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
MAMMALIA (NISP=12)	Mammals		
Leporidae	Hares, Rabbits		
Sylvilagus sp.	Cottontail	1	1
cf. *Sylvilagus* sp.	Cottontail	1	-
Geomyidae	Pocket Gophers		
Geomys bursarius	Plains Pocket Gopher	1	1
Antilocapridae	Pronghorn		
Antilocapra americana	Pronghorn	5	2
cf. *Antilocapra americana*	Pronghorn	2	-
Deer or Pronghorn		1	-
Bovidae	Bison, Cows		
Bison/*Bos*	Bison, cow	1	1
Indeterminate mammal (N=66)		-	-
TOTAL		12	5

Table 38

Identified Flora From 25HN40

unit	level	taxon	common	amount
1	0-10 cm	Helianthus annuus	sunflower	3*
		Chenopodium berlandieri	goosefoot	64*
1	10-20 cm	Helianthus annuus	sunflower	1*
		Amaranthus sp.	pigweed	5*
1	0-10 cm		charcoal	>1 g
		Helianthus annuus	sunflower	2*
		Chenopodium berlandieri	goosefoot	7*
1	30-40 cm		charcoal	1 g
Feature 1	30-40 cm		charcoal	16 g
		Helianthus annus	sunflower	1*
3	10-20 cm	Chenopodium berlandieri	goosefoot	35*
		Helianthus annuus	sunflower	2*
3	20-30 cm	Helianthus annuus	sunflower	2*
		Chenopodium berlandieri	goosefoot	3*

* fresh seed

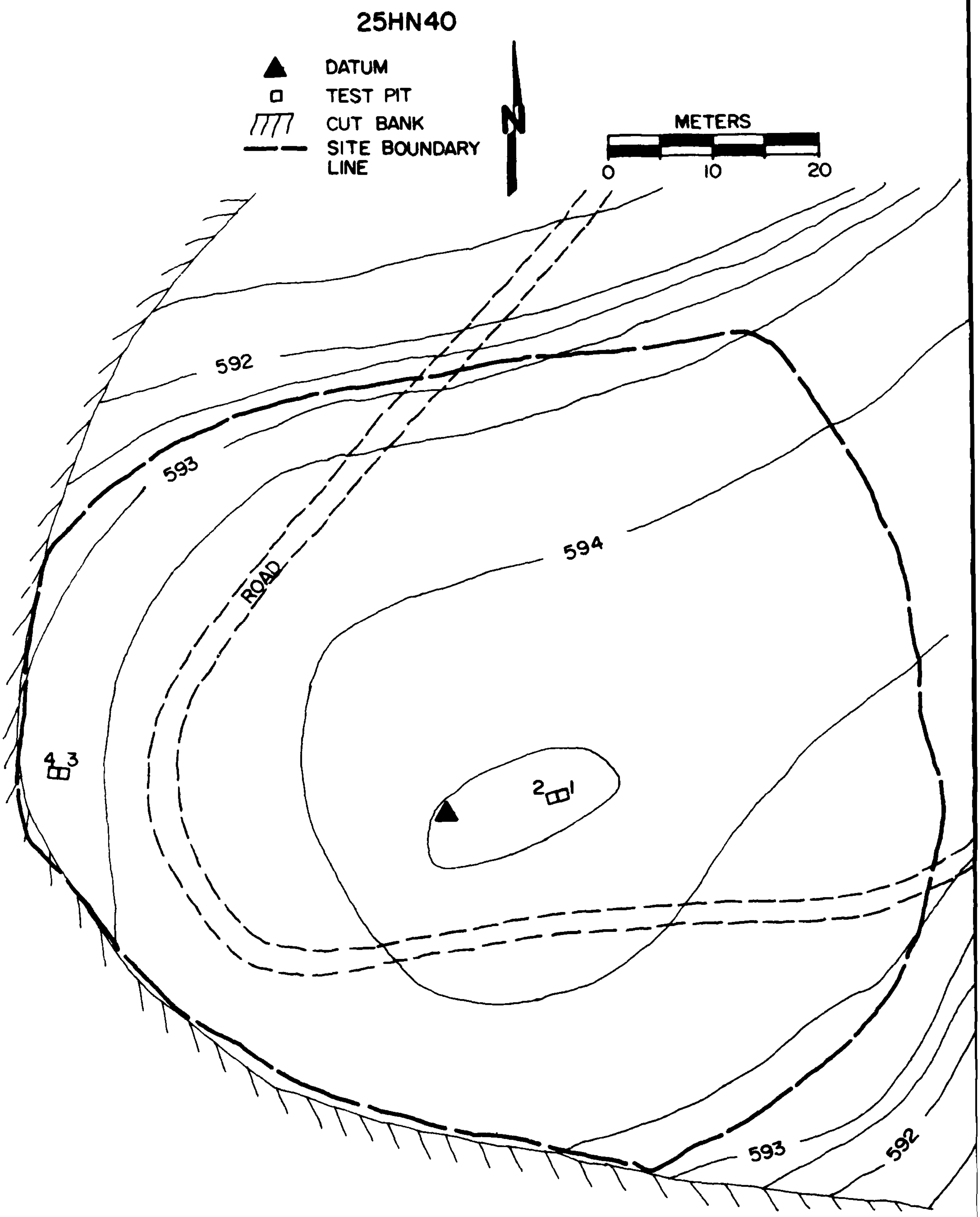


Figure 55. Site map of 25HN40.

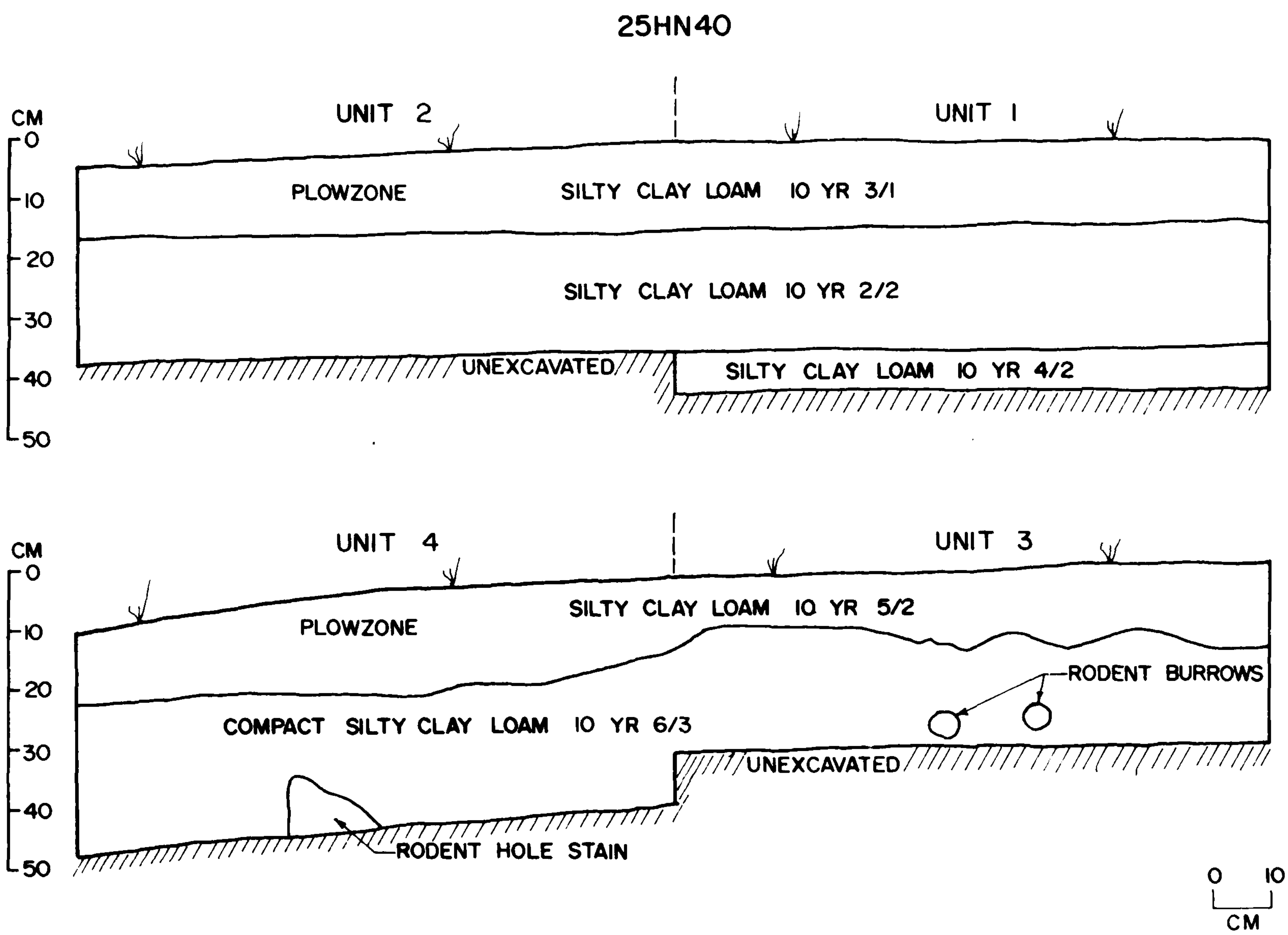


Figure 56. Profile of the north wall of units 1, 2, 3, and 4 at site 25HN40.

25HN40

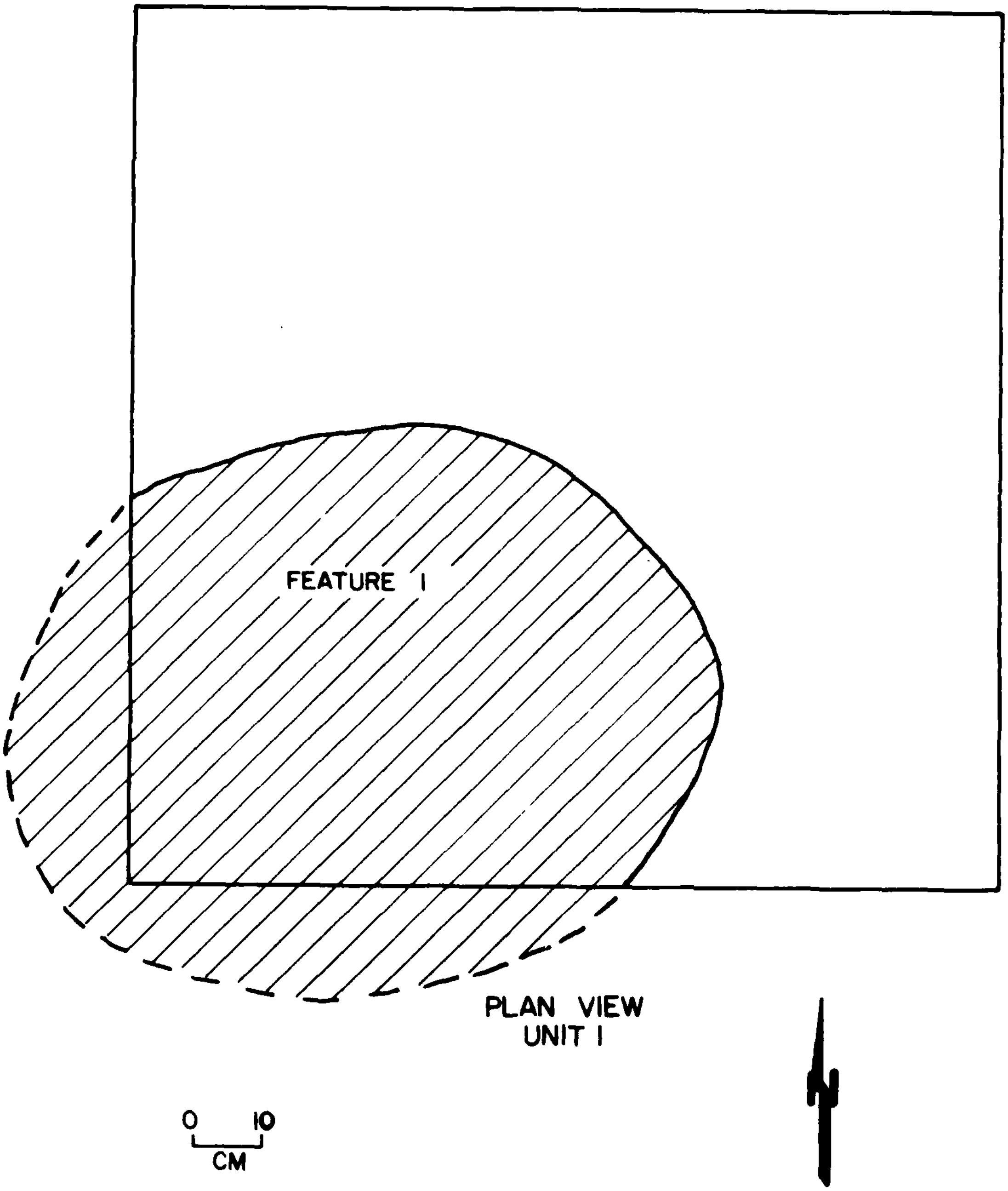


Figure 57. Plan view of feature 1, unit 1, at site 25HN40.

25HN40

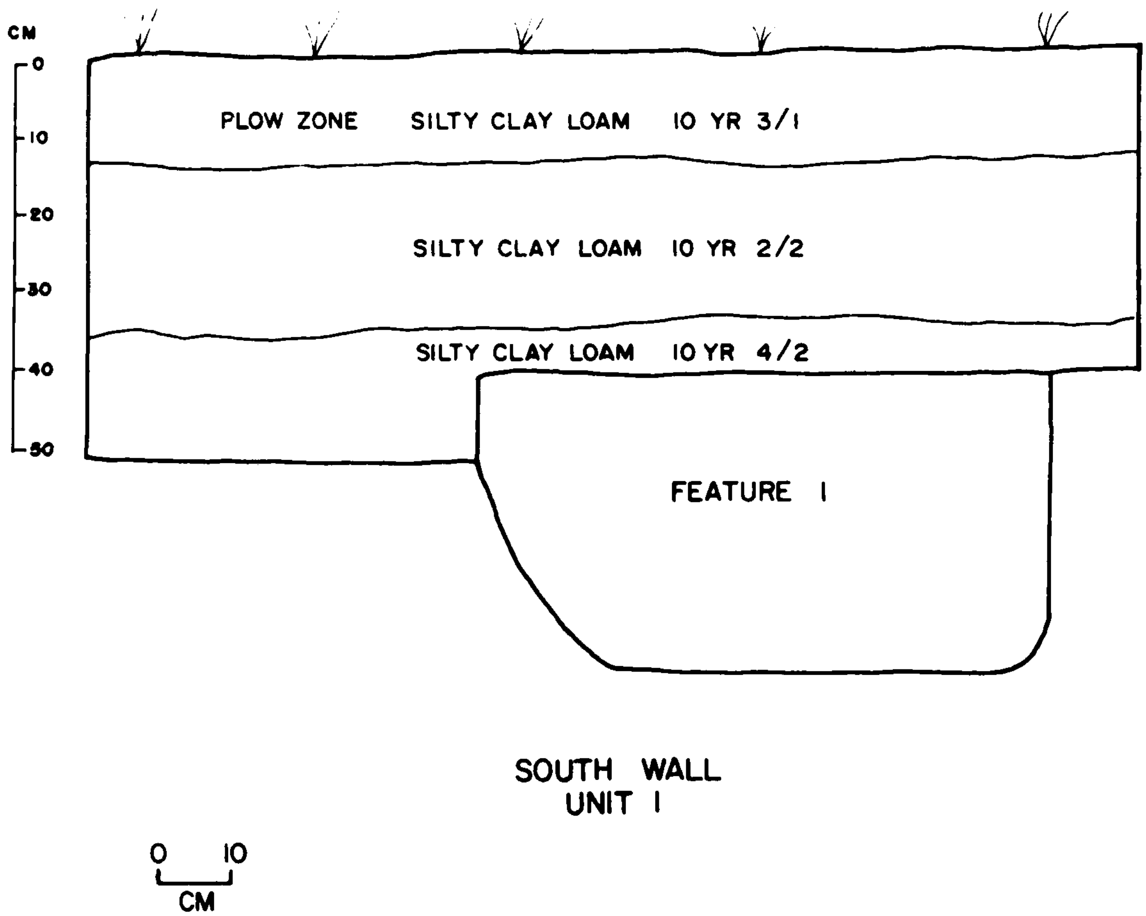


Figure 58 Profile of the South wall of Unit 1, showing the location of Feature 1, 25HN40.

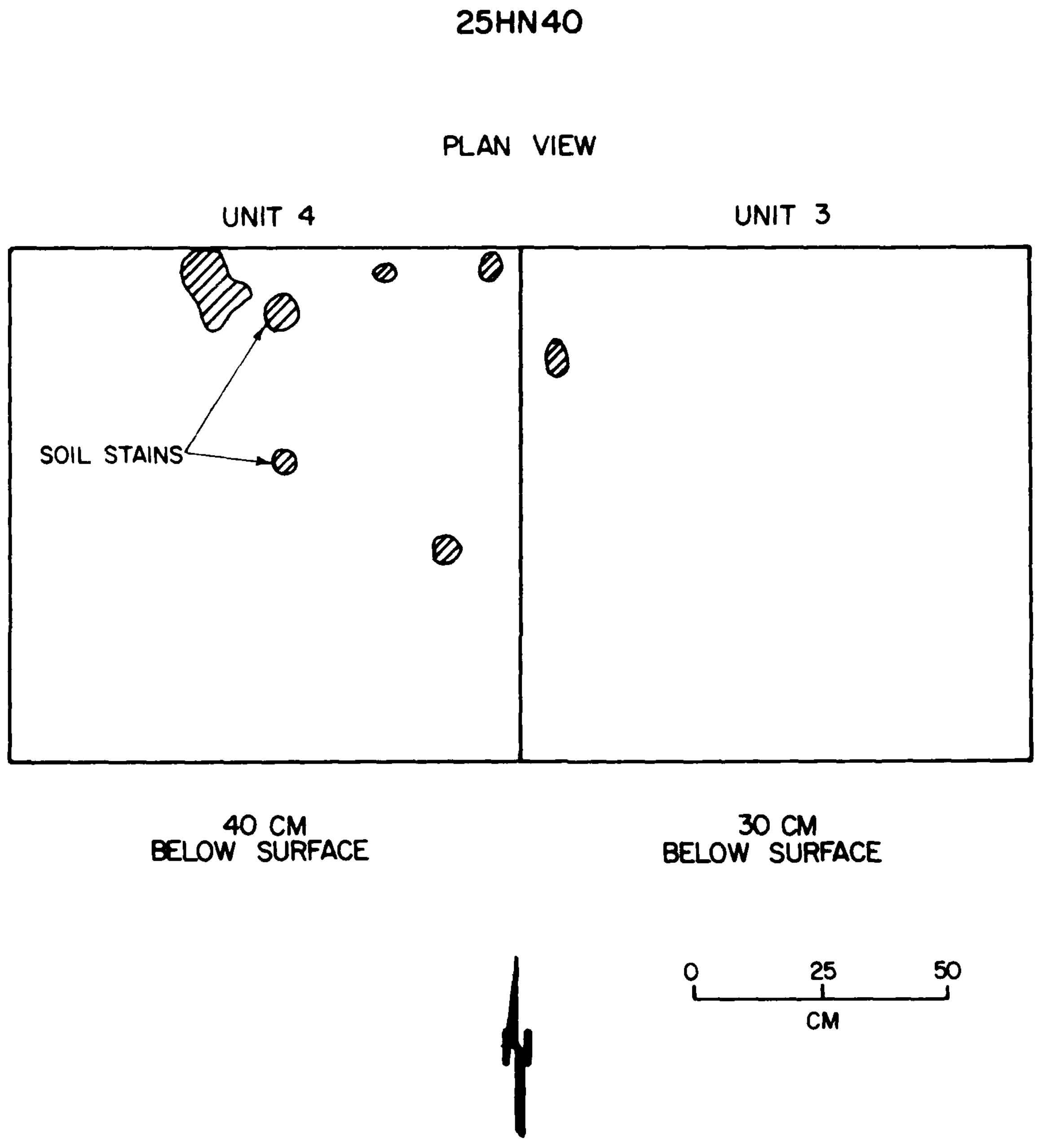


Figure 59. Plan view of units 3 and 4 at site 25HN40.

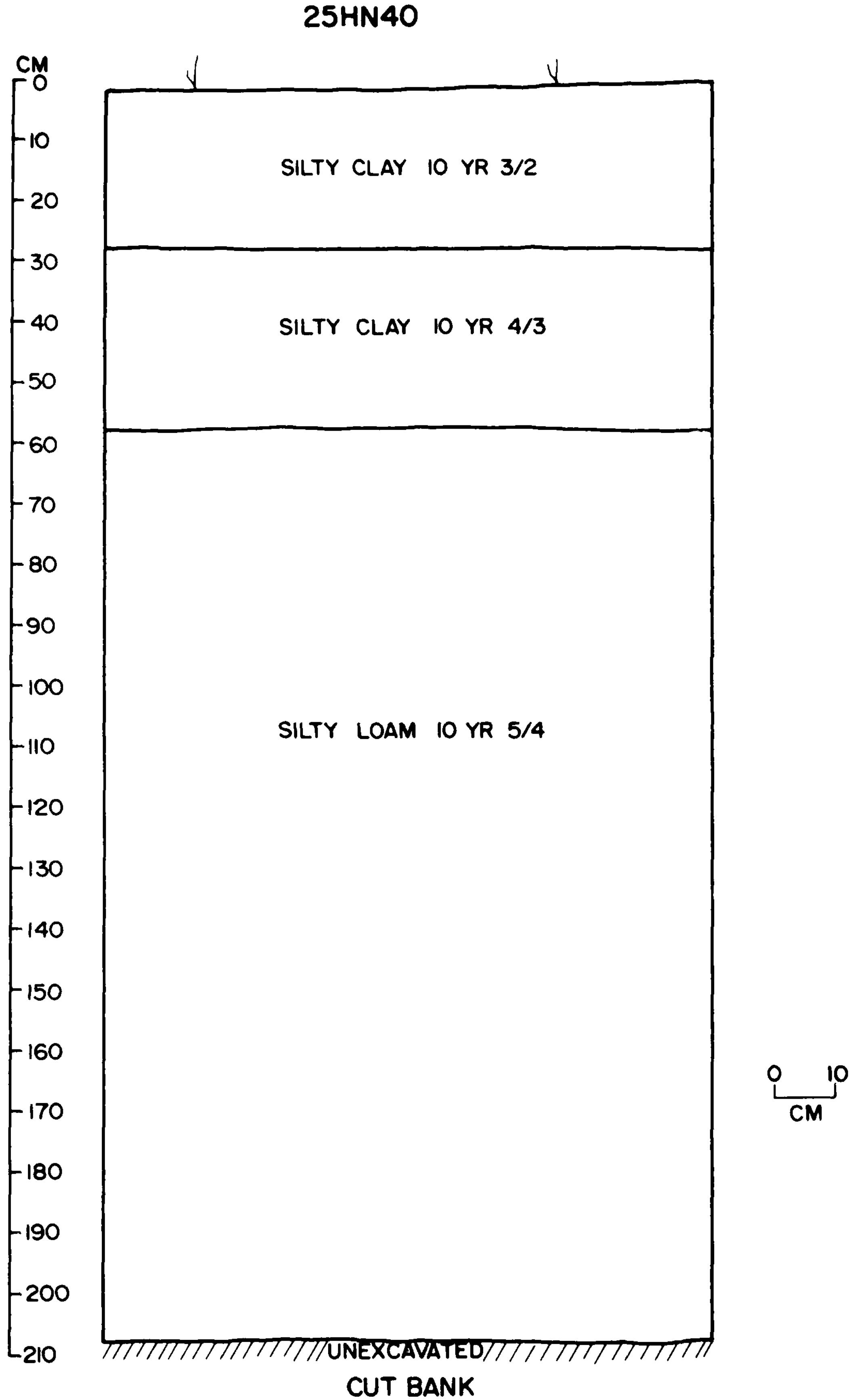


Figure 60. Profile of the cut bank at site 25HN40.

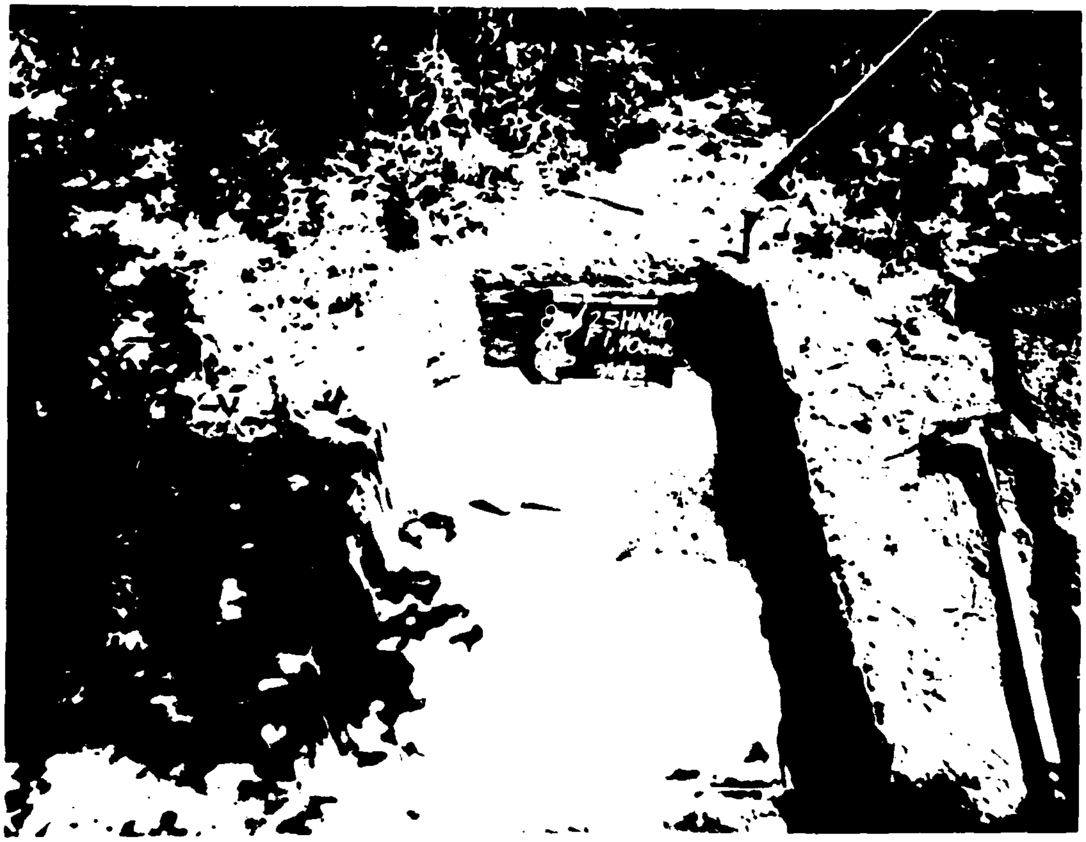


Plate 8. Site 25HN40, Feature 1. Unexcavated feature at 40 cm below surface.

25HN42

Figures	61 through 63
Site Type	Hunting and gathering camp
Recorded	unknown (Strong 1935, mentions it)
Size	3,500 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Ridge top
Name	Indian Hill
Drainage	Prairie Dog Creek
Surface Visibility	25 percent

Previous Research

Recorded in 1930 by the Nebraska State Archeological Society, this site received its name from the numerous skeletal remains unearthed over the years. Located on the highest hill top on the south side of the reservoir this site at one time offered a commanding view of the Prairie Dog Creek and Republican River Valleys. Today its location assures its protection from the waters of Harlan County Lake although it continues to be subject to vandalism (Pepperl and Falk 1978:25).

In 1930, at the request of several local amateurs, W.D. Strong conducted test excavations at the site. Even then he noted the evidence of recent pothunting and found it difficult to find intact portions of the site (Strong 1935:115). While his excavations failed to disclose cultural material, he described the two nearly complete skeletons and strings of shell beads and shell ornaments excavated by C.B. Schultz of Red Cloud, Nebraska (Strong 1935:115). He concluded that, without a systematic excavation of the entire summit, the exact nature of the site could not be determined.

In 1948, field school crews from the University of Nebraska, Lincoln, conducted a surface collection on Indian Hill and excavated three test units. They recovered over 450 artifacts including ceramic fragments, stone tools, shell beads, bird bone tubular beads and unidentified human and animal bone fragments.

The site was revisited in 1972 (Falk and Theissen 1972) and 1977 (Pepperl and Falk 1978) and extensive recent disturbances were noted on both occasions. The proposed field investigations for the present project included test excavations to determine: (1) the vertical and horizontal extent of the site; (2) the cultural affiliation; and (3) the severity and amount of destruction at the site (Adair and Brown 1985:42).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 and two 1 X 1 meter units (Figs. 61 through 63). Manual excavations were done in arbitrary 10 cm levels. Units 1, 2 and 4 were dug to a depth of 30 cm, units 3 and 6 were dug to 40 cm and unit 5 was dug to 70 cm. Most cultural material was recovered from the uppermost 30 cm (Tables 39 and 40). Because of numerous vandal holes and rodent burrows, the test units were placed in areas where soil disturbance appeared to be minimal. Most of the units are believed to be in relatively undisturbed areas with the exception of unit 5 which turned out to be in the middle of a previous vandal hole. A Sinclair oil can was recovered at 70 cm within unit 5 (Fig. 63). A previously excavated hole was observable in the profile of unit 5 (Fig. 63). The recovery of small, triangular arrow points and pottery indicate an Upper Republican occupation (Tables 39 and 40).

Interpretations

Indian Hill, 25HN42, is believed to be a seasonal hunting and gathering camp used by Upper Republican peoples. Although previous investigators have recovered some human burials from the site, present research indicates primarily a subsistence oriented occupation. The recovery of projectile points, ceramics and a variety of stone tools and some faunal remains (Table 41) suggest use of the site for hunting and gathering in addition to usage as a human burial area. The location of the site on a prominent ridge top with an excellent view of the Prairie Dog Creek and Republican River valleys would have made it ideal for a hunting camp. This same advantage, however, would not have been apropriate for occupation during the winter months.

Recommendations

Indian Hill has been severely disturbed by a vehicular trail that traverses the center of the site, numerous vandal pits and rodent burrows. The site is assigned to an Upper Republican occupation. Because other sites with Upper Republican occupations in the Harlan County Lake area have much better cultural integrity, this site is of much less significance. Because of these severe disturbances, the authors do not believe the site contains in situ, significant scientific data that would help elucidate the prehistory of the region. The authors, therefore, recommend that the site not be considered potentially eligible for nomination to the National Register of Historic Places.

Table 39

25HN42
Artifacts

Unit 1	flakes	potlids	shatter	body sherds	rim sherds	historic
0-10 cm	14		16			
10-20 cm	5					
20-30 cm						
Unit 2						
0-10 cm	26	2	20	4		
10-20 cm	26	1	25	4		
20-30 cm	2					
Unit 3						
0-10 cm	79	1	61	6		
10-20 cm	48		26	3		
20-30 cm	13		15	1		
30-40 cm	6		1			
Unit 4						
0-10 cm	169	2	118	13		
10-20 cm	25		23			
20-30 cm	6		2			
Unit 5						
0-10 cm	32	1	27	5		8 plastic
10-20 cm	34		23	2	1	2 22 cal.
20-30 cm	27		22	2		1 22 cal.
30-40 cm	39		21	2		
40-50 cm	26		22	1		
50-60 cm	33		11	4		
60-70 cm	31		12	4		
Unit 6						
0-10 cm	18		14			
10-20 cm			3			
20-30 cm			2			
30-40 cm						
Totals	659	7	466	51	1	11
Surface	5					

Table 40

25HN42 Tools

artifact	unit/level	description
projectile point	1 / 0-10 cm	small triangular shaped, side notched, blade missing, biface
projectile point	2 /10-20 cm	small triangular shaped, side notched, base partially missing, biface
projectile point	4 /10-20 cm	small triangular shaped, unnotched, tip missing, biface
projectile point	5 /20-30 cm	small triangular shaped, corner notched, tip and base missing, biface
	5 /40-50 cm	small triangular shaped, corner notched, blade and base missing, biface
point/knife	2 / 0-10 cm	triangular shaped biface, base missing
	3 /10-20 cm	triangular shaped biface, base missing
	5 /20-30 cm	triangular shaped biface, base and tip missing
knife	5 /30-40 cm	biface, base missing
biface resharpening flake	5 /50-60 cm	complete
indeterminate	5 /30-40 cm	biface, base missing
sandstone		6.9 grams total
limestone		4.9 grams total
quartzite		9.1 grams total
conglomerate		12.8 grams total
granite		13.3 grams total
yellow plastic		2.5 grams total
white, plastic cigar butt		0.3 grams total
(2) brass .22 cal. long rifle shells		
(1) brass .22 cal. magnum shell		

Table 41

Taxonomic Composition of Vertebrate Remains From Site 25HN42 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
MAMMALIA (NISP=7)	Mammals		
Cricetidae	New World Rats and Mice		
Ondatra zibethicus	Muskrat	1	1
Unidentified rodent		3	1
Wapiti or Bison		2	1
Bison-size		1	-
Indeterminate mammal (N=71)		-	-
TOTAL		7	3

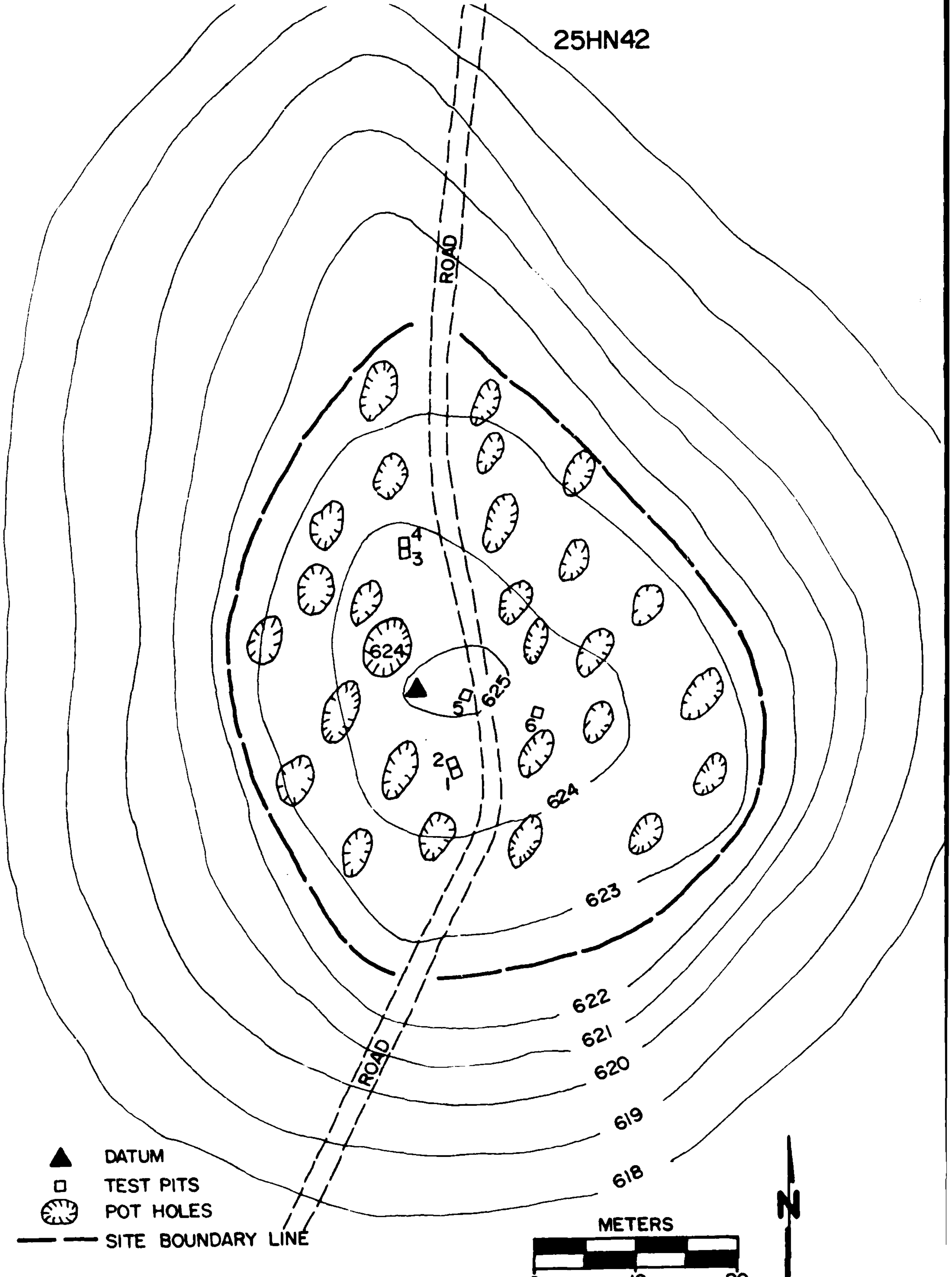


Figure 61 Site Map, 25HN42

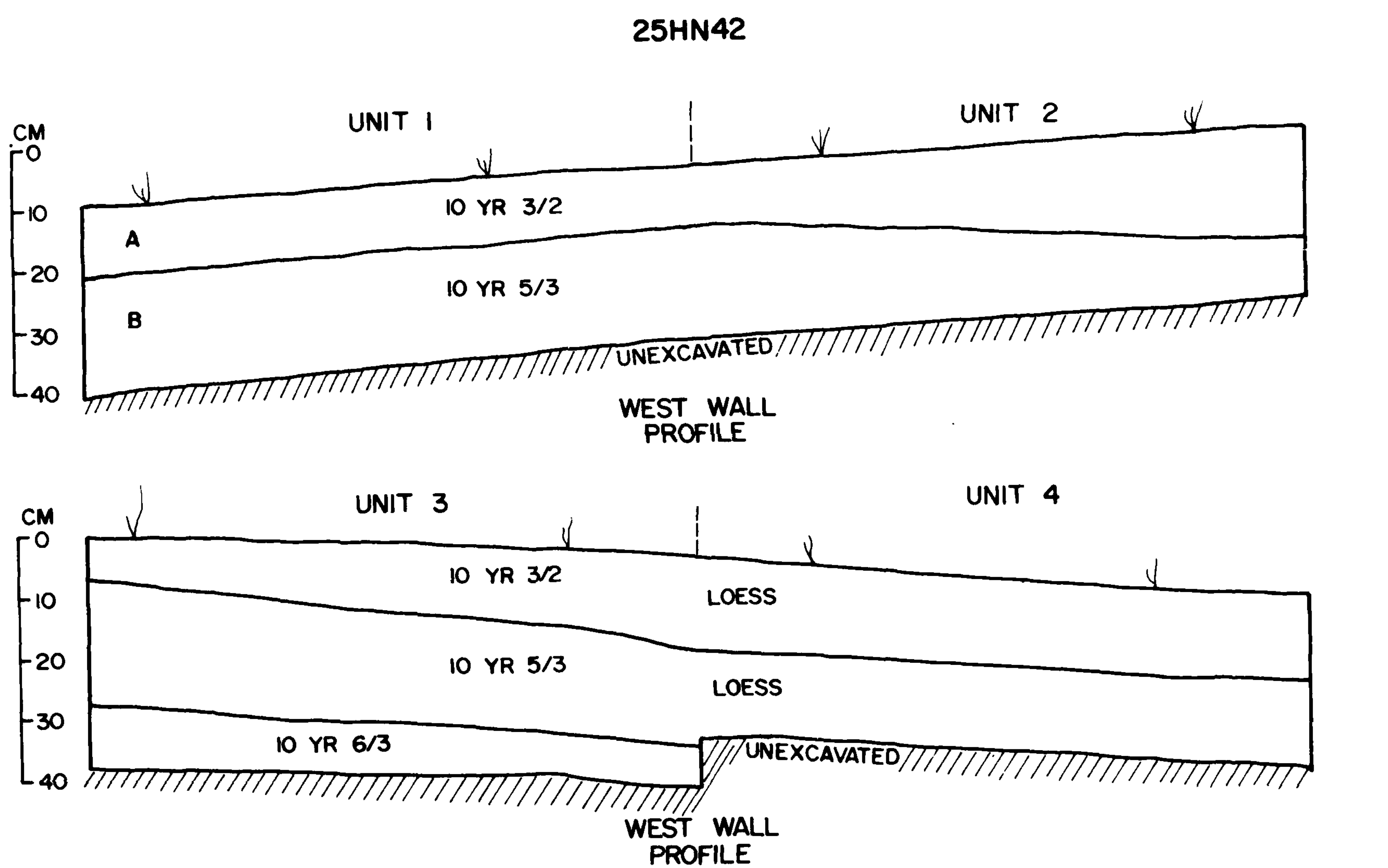


Figure 62. Profile of units 1, 2, 3, and 4 at site 25HN42.

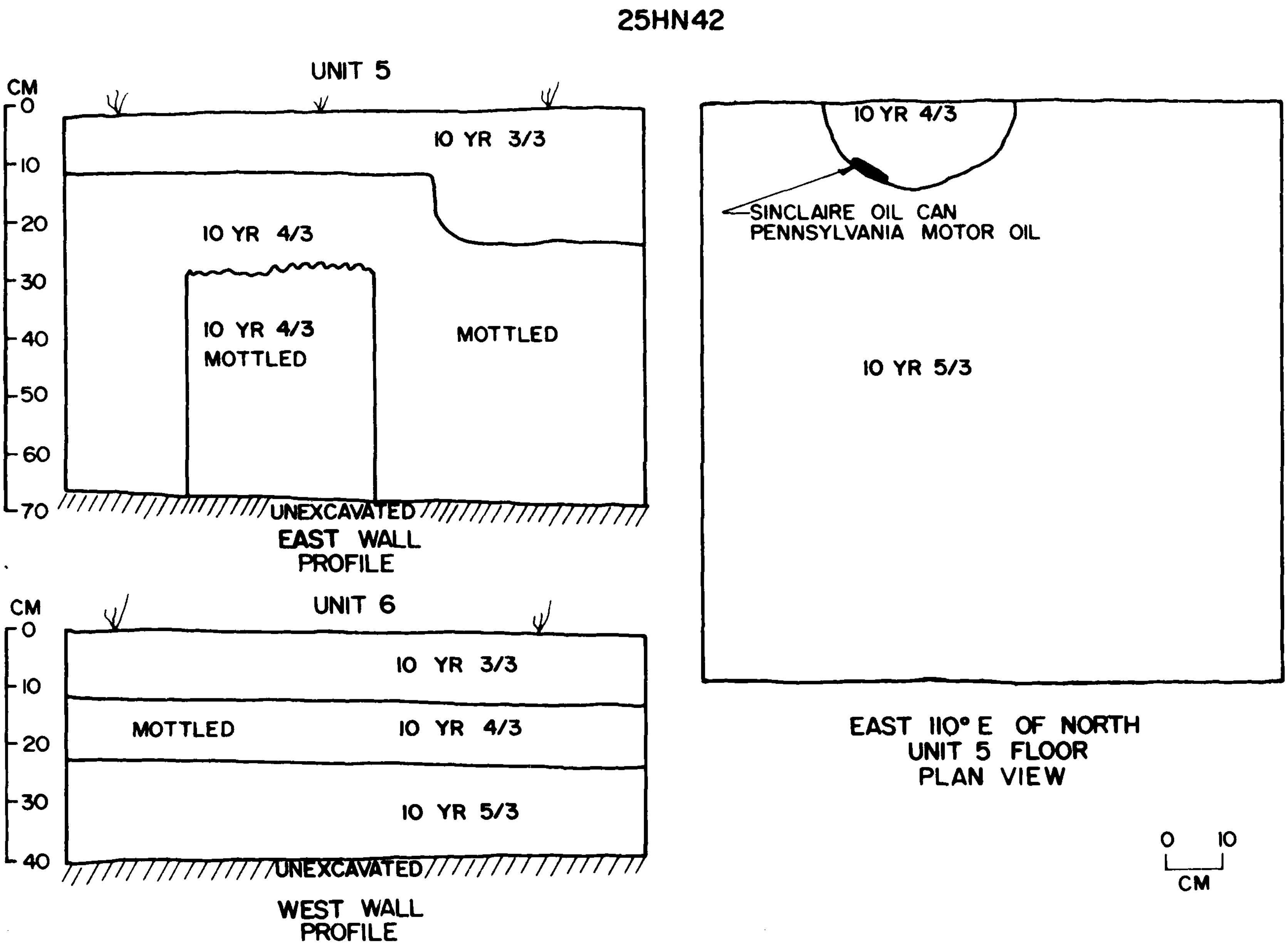


Figure 63. Profile of units 5 and 6 and plan view of unit 5 at site 25HN42.

25HN50

Figures	64 through 66
Site Type	Village or hunting and gathering camp, historic school
Size	4,400 square meters
Recorded	1977, University of Nebraska
Cultural Affiliation	Plains Woodland, Euro-American
Topographic Setting	Terrace
Name	Rural School District No. 9
Drainage	Methodist Creek
Surface Visibility	25 percent

Previous Research

This site was first recorded in 1977 by the University of Nebraska (Pepperl and Falk 1978). It is located on a high terrace above the former channel of Methodist Creek and is subject to destructive impact through wave action and vandalism. Professional investigations continued in 1979-1980 when two concentrations of artifacts were recognized (Roetzel et al. 1982:95-97). These are believed to represent two occupations: one that is inundated and repeatedly redeposited by wave action and a second that is eroding out of the cut bank onto the beach. Both occupations are assigned to the the Woodland period. The investigations proposed for 1985 focused primarily on the second occupation and included planing of the cut bank to determine the depth of the cultural deposits (Adair and Brown 1985:42).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units and examination of the cut bank that occurs on the south and east edges of the site (Figs. 64 through 66). Manual excavations were done in arbitrary 10 cm levels. Units 2 and 4 were dug to a depth of 30 cm, unit 3 was dug to 20 cm and unit 1 was dug to 60 cm. In the area where units 3 and 4 were dug, most artifacts were recovered (Table 42). Units 1 and 2 were placed, unintentionally, in an area of extreme rodent burrowing. Consequently, cultural remains, both prehistoric and historic, occurred to a depth of 60 cm in unit 1 (Fig. 65). A unifacially flaked end scraper that is sub-triangular in shape and plano-convex in cross-section, was recovered from unit 2 at a depth of 10-20 cm. The proximal end is missing. A bifacially flaked knife was recovered from unit 1 at a depth of 30-40 cm. The tip and base are missing. A retouched flake was recovered from unit 1 at a depth of 50-60 cm. A total of six mammalian faunal remains, including two of a plains pocket gopher (*Geomys bursarius*) was recovered. Historic artifacts, that included cast iron stove parts, wire nails, a railroad spike, bottle glass, window glass, coal cinders, shale, coal, brick fragments and a wood screw, occurred in great frequency with the few prehistoric artifacts. An piece of amber bottle glass was recovered from unit 1 at a depth of 50-60 cm. Cast iron parts of an old school desk were observed on the beach. Because of artifact mixing, it was determined that the prehistoric occupation has been almost completely destroyed by shoreline erosion, rodent burrowing and construction and use of a school on the site from 1873 to 1951.

History

The archaeological team located a number of surface remains at site 25HN50 that indicated a schoolhouse once stood at the location. These surface finds included broken pieces of glass, iron parts and side panels to several small desks, parts of the door and plates to a pot-bellied heating stove, the top section of an ink well, and several broken bricks. Most of the surface finds were of late nineteenth and early twentieth century origin, although interviews with local residents indicated that a schoolhouse was there as late as the 1950's. No foundation walls were found as the site is located in a badly eroded inlet of Harlan County lake and is often submerged. Using old county maps and information available at the office of the Harlan County School Superintendent at the county courthouse in Alma, it was determined that these surface finds were from the District No. 9 schoolhouse. The schoolhouse was abandoned with the consolidation and unification of School District No. 2 at nearby Alma on February 28, 1951.

The history of the site as a location for a schoolhouse dates back to the early years of county organization. This location was originally the site of a dugout schoolhouse as early as 1873. In the Harlan County School District Organization Records, it was noted that District No. 9 was organized on March 22, 1873. A dugout was constructed shortly thereafter and used for several years. In 1879, the Teachers Summary and Term Report records noted that there were 17 pupils attending the school. This number stayed at or dropped from this level throughout much of the 1880's. However, dugouts had a limited length of time in which they could be used, so the need soon arose for the construction of a more substanial schoolhouse. In the early 1880's, a sod school was built to replace the deteriorating dugout. A sod structure also had a relatively short lifespan, and so this school was only used until June 1886. On July 31, 1886, the sod structure was condemned, and a new frame schoolhouse was built for the next school term. Records indicate the wooden structure was still there until consolidation with the Alma School District in 1951. The large number of bricks found on the site of the school indicate the building either had a brick foundation or a partial foundation, or a brick chimney. Unfortunately, photographs of the building were unavailable at the local historical museum at Orleans, the Nebraska State Historical Society, the county library system, or the county courthouse. The schoolhouse no doubt disappeared shortly after the construction of Harlan County Lake, as the building was located literally on the edge of the shoreline.

Interpretations

Rural School District No. 9 site, 25HN50, has been severely disturbed. The cultural remains present on the beach, below the terrace, have all eroded from the terrace. There is no evidence, archaeologically or geomorphologically, that another occupational horizon is present in the soils that compose the present beach. Because of severe site disturbance and destruction, few interpretations can be made regarding the prehistoric occupation. The site was probably a semi-permanent village or a seasonal hunting and gathering camp used by Plains Woodland (Keith variant?) peoples. The historic occupation of the site, which consists of a schoolhouse, is outlined above. Construction of the campground disturbed the site by excavation of cooking pits, water lines, electrical lines, grading of roads and pavement.

Recommendations

The prehistoric Plains Woodland occupation at the Rural School District No. 9 site, 25HN50, has been nearly destroyed by construction and use of the site for a school from 1873 to 1951, severe shoreline erosion, extensive rodent burrows and its present use as an improved campground. Examination of the cut bank indicates the prehistoric and historic (i.e., school) cultural remains are confined to the uppermost 20 cm to 30 cm of deposits where rodent burrows have disturbed them. The recovery of a low frequency of prehistoric artifacts and the destruction of the school at the time of construction of Harlan County Lake suggests the site is not significant. The authors believe the site does not contain significant scientific data that would help elucidate the culture history of the region. Consequently, the authors do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 42

25HN50
Artifacts

Unit 1	flakes	blades	potlids	shatter	historic
0-10 cm					3 nails, 2 glass, 1 stove frag., 1 brick frag.
10-20 cm	2		1	1	6 glass
20-30 cm	16		2	9	1 stove part, 4 cinders
30-40 cm	14	1		5	brick fragments 2 pieces coal, 6 cinders
40-50 cm	9				1 nail, brick fragments 3 cinders, 15 pieces coal
50-60 cm	9	1		5	1 glass, 6 pieces coal
Unit 2					
0-10 cm	7				1 glass, 2 nails, 1 screw, 1 wire 3 pieces shale
10-20 cm	3			1	1 glass, 1 nail
20-30 cm					
Unit 3					
0-10 cm	4				
10-20 cm	2				
Unit 4					
0-10 cm	9		1	2	
10-20 cm	1				
20-30 cm	3				
Totals	79	2	3	23	62
Surface	17	1		1	1 brick frag., 3 pieces coal, 2 pieces shale

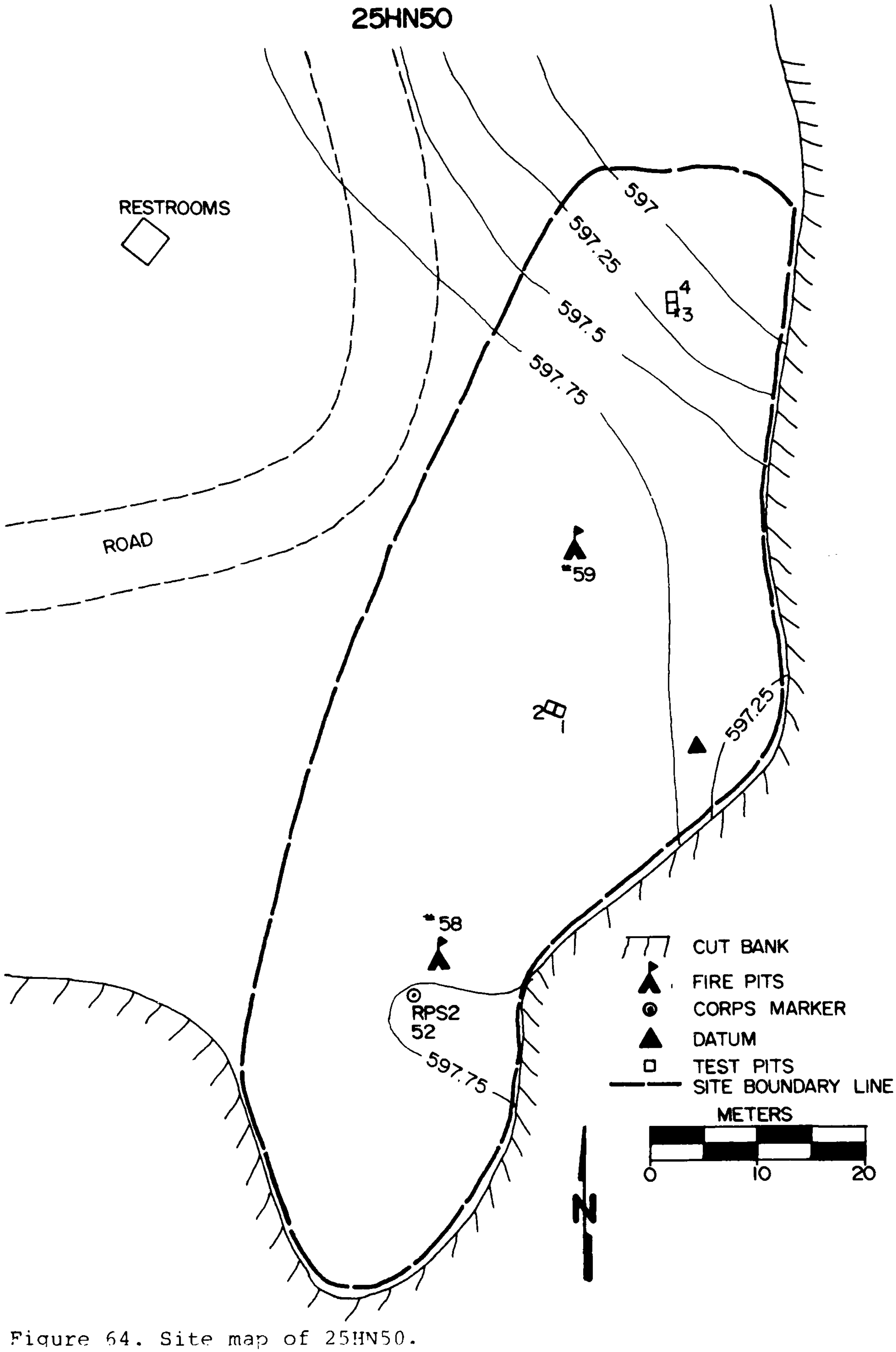


Figure 64. Site map of 25HN50.

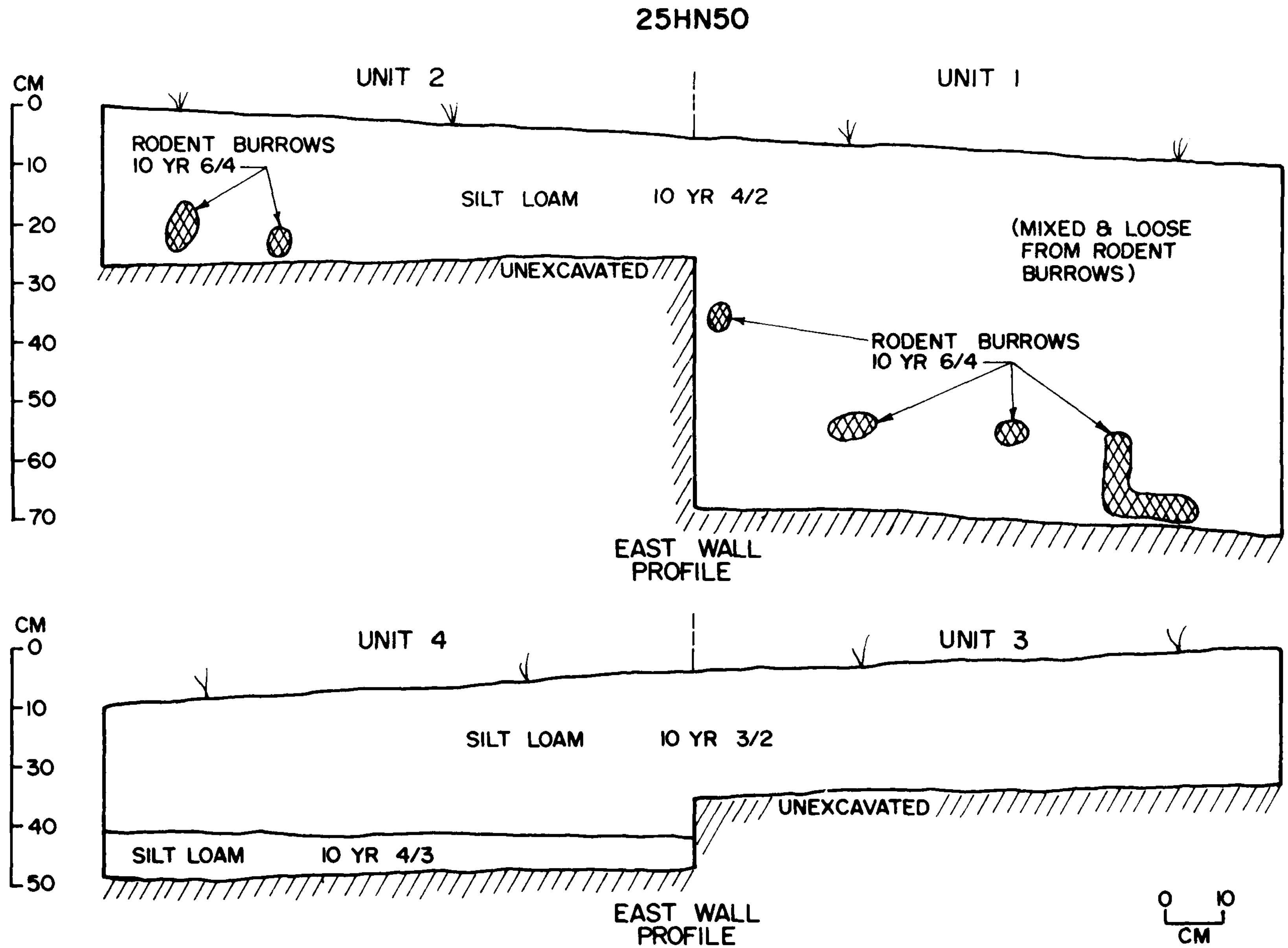


Figure 65. Profile of units 1, 2, 3, and 4 at site 25HN50.

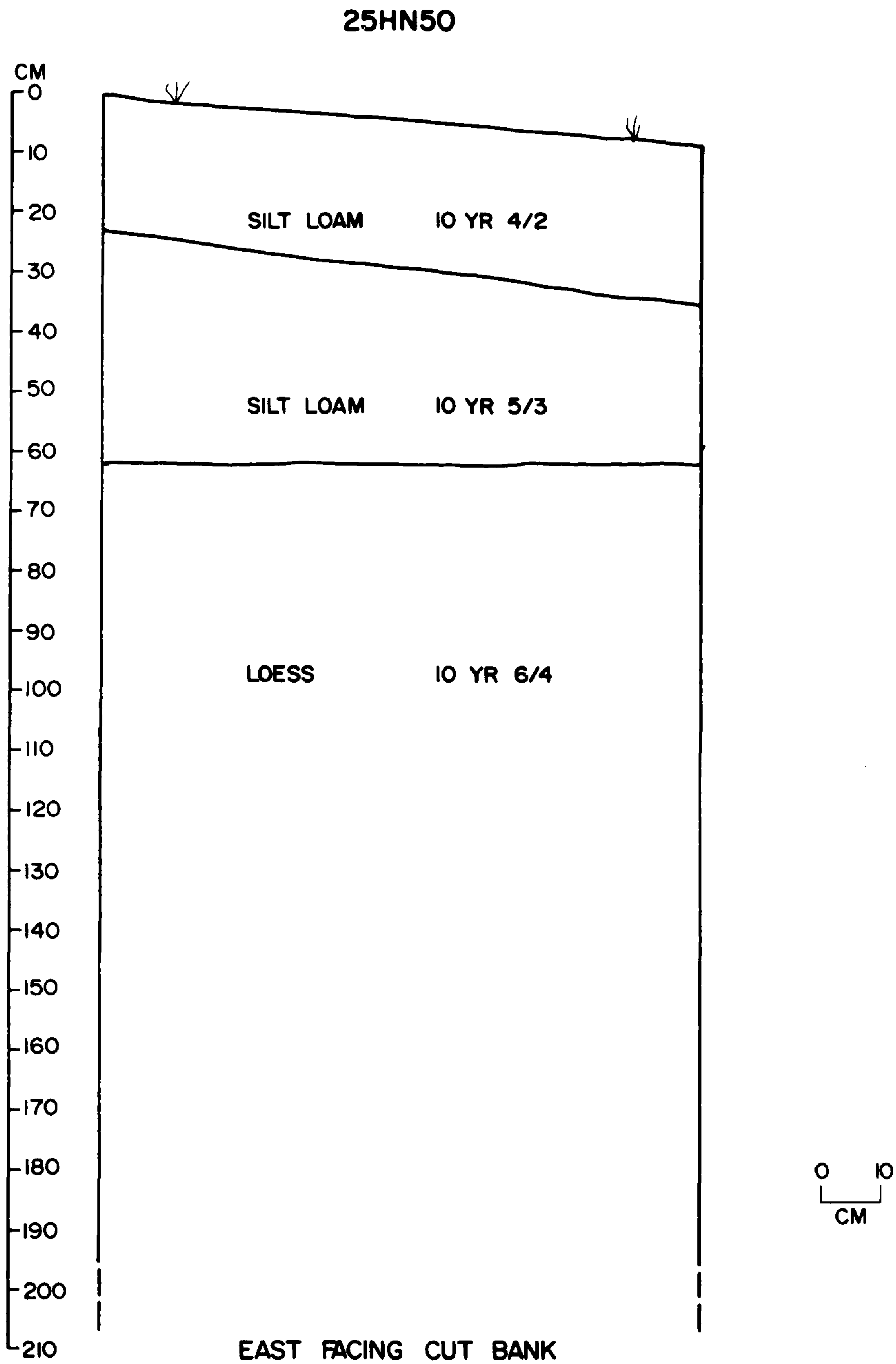


Figure 66. Profile of cut bank at site 25HN50.

25HN51

Figures	67 and 68
Site Type	Hunting and gathering camp
Recorded	1977, University of Nebraska
Size	9,000 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Ridge slope
Name	Railroad Bridge
Drainage	Methodist Creek
Surface Visibility	10 percent

Previous Research

First recorded in 1977 by the University of Nebraska, this site was mapped on a sloping divide or bench of Methodist Creek. A surface reconnaissance plotted over 1,280 artifacts within an area 200 meters east-west by 180 meters north-south. All specimens were left in place. No culturally diagnostic artifacts were identified.

1985 Investigations

Field investigations proposed for this project included manual excavation of test units and systematic augering or shovel tests to determine: (1) the vertical depth of the cultural deposits; (2) the cultural affiliation; (3) the nature of the prehistoric occupation; and (4) the amount, if any, of destruction due to erosion or vandalism.

Investigations consisted of manual excavation of two 1 X 2 meter units (Figs. 67 and 68). Manual excavations were done in arbitrary 10 cm levels. Units 1 and 3 were dug to a depth of 30 cm and units 2 and 4 were dug to 20 cm. Most artifacts were recovered from the uppermost 20 cm (Table 43). Three bifacially flaked points/knives were recovered from test excavations. Two were from unit 1 at a depth of 0-10 cm. Both specimens lack bases. The third was from unit 3 at a depth of 0-10 cm. It lacks its proximal and distal ends. Faunal remains consist of one unidentified bone fragment. Pieces of quartzite from test excavations total 114.5 grams and a piece of historic whiteware was recovered from unit 4 at a depth of 0-10 cm. There appeared to be a discernible plow zone at 15 to 20 cm, although the site is presently in grass. The loess soils are indicative of a relatively stable ground surface for the past several thousand years. Cultural features may be present but, if so, they have been truncated by the plow.

Interpretations

The Railroad Bridge site, 25HN51, has been severely disturbed by modern cultivation practices. Cultural remains are confined to the uppermost 20 cm, or within the old plow zone. The absence of a midden indicates the site was not used intensively. This is probably a seasonal hunting and gathering camp used by Upper Republican peoples. The large quantities of lithic debris indicate stone tool manufacture and maintenance were primary tasks performed at the site.

Recommendations

The Railroad Bridge site, 25HN51, does not have in situ cultural remains below the plow zone. Investigations in 1985 recovered most cultural material in the uppermost 10 cm of soil. Consequently, the authors do not believe the site contains significant scientific data that would help elucidate the culture history of the region. The site is not recommended by the authors as being potentially eligible for nomination to the National Register of Historic Places.

Table 43

25HN51
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	historic
0-10 cm	20	1		3	2	
10-20 cm	1					
20-30 cm						
Unit 2						
0-10 cm	31			2	10	
10-20 cm						
Unit 3						
0-10 cm	87	1	1	18	23	
10-20 cm	18				6	
20-30 cm	1					
Unit 4						
0-10 cm	94	1	1	20	21	1 white-ware
10-20 cm	29			4	3	
Totals	281	3	2	47	65	1

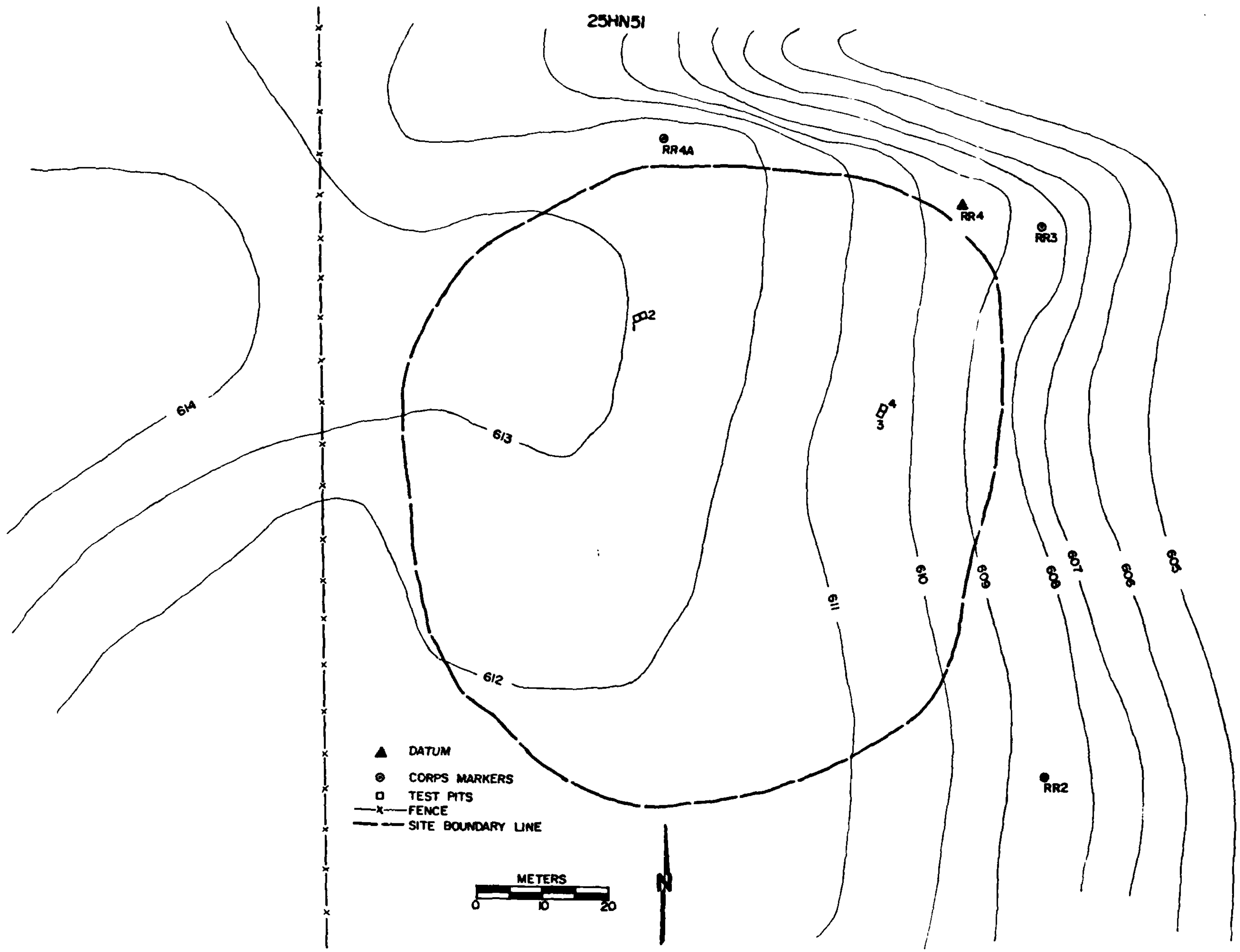


Figure 67. Site map of 25HN51.

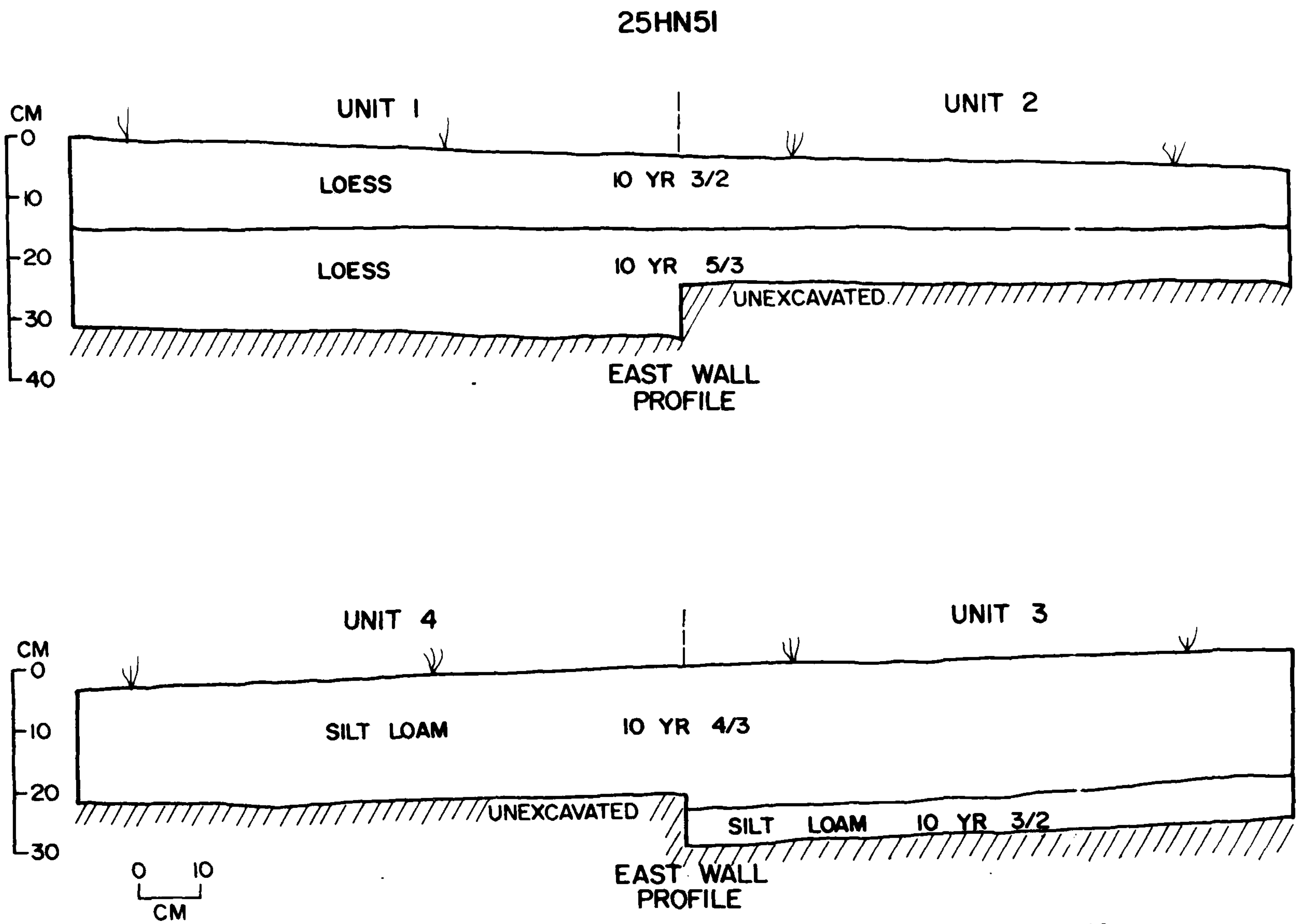


Figure 68. Profile of excavation units 1, 2, 3, and 4 at site 25HN51.

25HN52

Figures	69 and 70
Site Type	Hunting and gathering camp
Recorded	1977, University of Nebraska
Size	8,500 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Ridge top and slope
Name	unnamed
Drainage	Methodist Creek
Surface Visibility	50 to 100 percent

Previous Research

As with site 25HN51, no surface collections or subsurface tests had been conducted at this site prior to this project. Also recorded in 1977 by the University of Nebraska (Pepperl and Falk 1978), it is located on a sloping divide of Methodist Creek. In 1977, surface materials were noted in an area approximately 150 meters north-south by 100 meters east-west on the top of a knoll. Most of the artifactual scatter appeared to lie just outside of the Corps of Engineers property boundary. Observed artifacts included both lithics and ceramics. Pepperl and Falk (1978) suggested a site size of 15,000 square meters. Because so little was known about this site, the 1985 field investigations were designed to include manually excavated test units to determine vertical and horizontal extent of the site.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units (Fig. 69). A survey of the surface scatter of artifacts was also conducted. Based on the surface scatter of artifacts, nearly all of the site occurs on private lands adjacent to the Corps property (Fig. 69). The two test units were placed as near to the Corps of Engineers boundary as possible to determine whether cultural remains extended on to Corps property. Manual excavations were done in arbitrary 10 cm levels. Each of the four 1 X 1 meter excavation units were dug to a depth of 30 cm. All cultural remains were recovered from depths of 10 cm to 20 cm (Table 44). Only a few artifacts were recovered from the test excavations (Table 44). A retouched flake and bottle glass were collected from the surface as were most of the artifacts (Table 44). The ceramics recovered from the surface are of the style associated with the Upper Republican complex (see Chapter 9).

All of the artifacts collected from the surface were from areas adjacent to and up slope of the Corps lands. The few artifacts recovered from the test pits may have washed down slope from the major site area located on the ridge top. Although the site is now in grass and brush, a distinct plow zone was delineated in the soil profiles (Fig. 70). The old plow zone was approximately 20 cm to 25 cm thick. Consequently, the cultural remains occur within the plow-zone. Because of extreme surface erosion on the site, it is unlikely that any cultural remains are in situ.

Interpretations

Site 25HN52 is a seasonal hunting and gathering camp that was used by Upper Republican peoples. The absence of a midden and the presence of a thin scatter of surface artifacts indicate the site was not used intensively but, rather, was used for only short periods of time. The location of the site on a ridge top with a good view of the Methodist Creek Valley make it ideal for a hunting and gathering camp. In contrast, its exposed location would have made the site undesirable for winter occupation.

Recommendations

Site 25HN52 has been severely disturbed by surface erosion. Most, if not all, of the site occurs on private lands adjacent to Corps of Engineers property. The recovery of a few flakes from 10 cm to 20 cm on Corps property may be the result of redeposition of cultural materials. Based on the low frequency of cultural materials recovered in 1985, the authors do not believe the site contains significant scientific data that would help elucidate the culture history of the region. Consequently, the authors do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 44

25HN52
Artifacts

Unit 1	flakes	blades	shatter	body sherds	rim sherds	historic
0-10 cm						
10-20 cm	1					
20-30 cm						
Unit 2						
0-10 cm						
10-20 cm	1					
20-30 cm						
Unit 3						
0-10 cm						
10-20 cm	1		1			
20-30 cm						
Unit 4						
0-10 cm						
10-20 cm	2					
20-30 cm						
Totals	5		1			
Surface	33	2	4	89	5	1 glass bottle

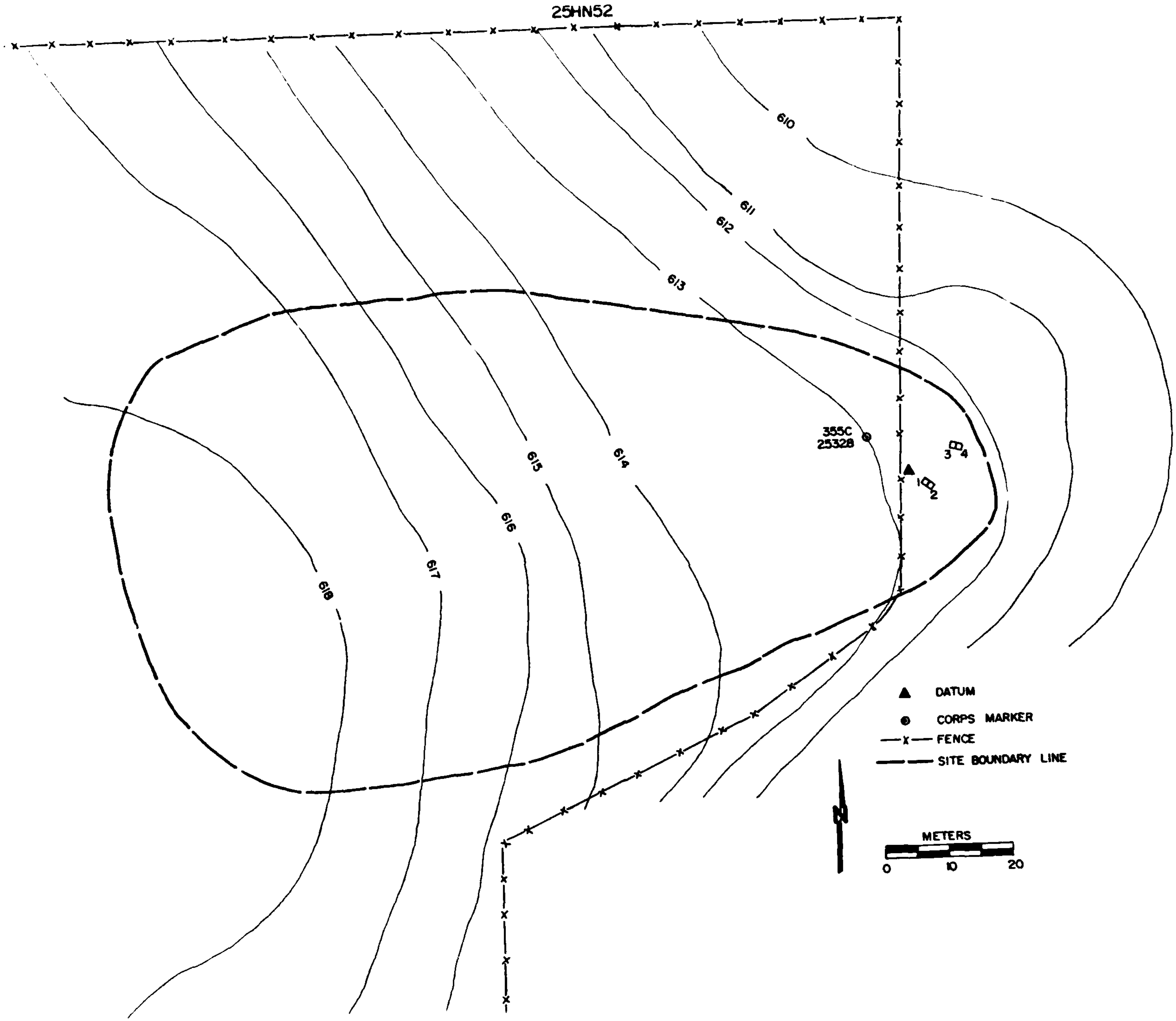


Figure 69. Site map of 25HN52.

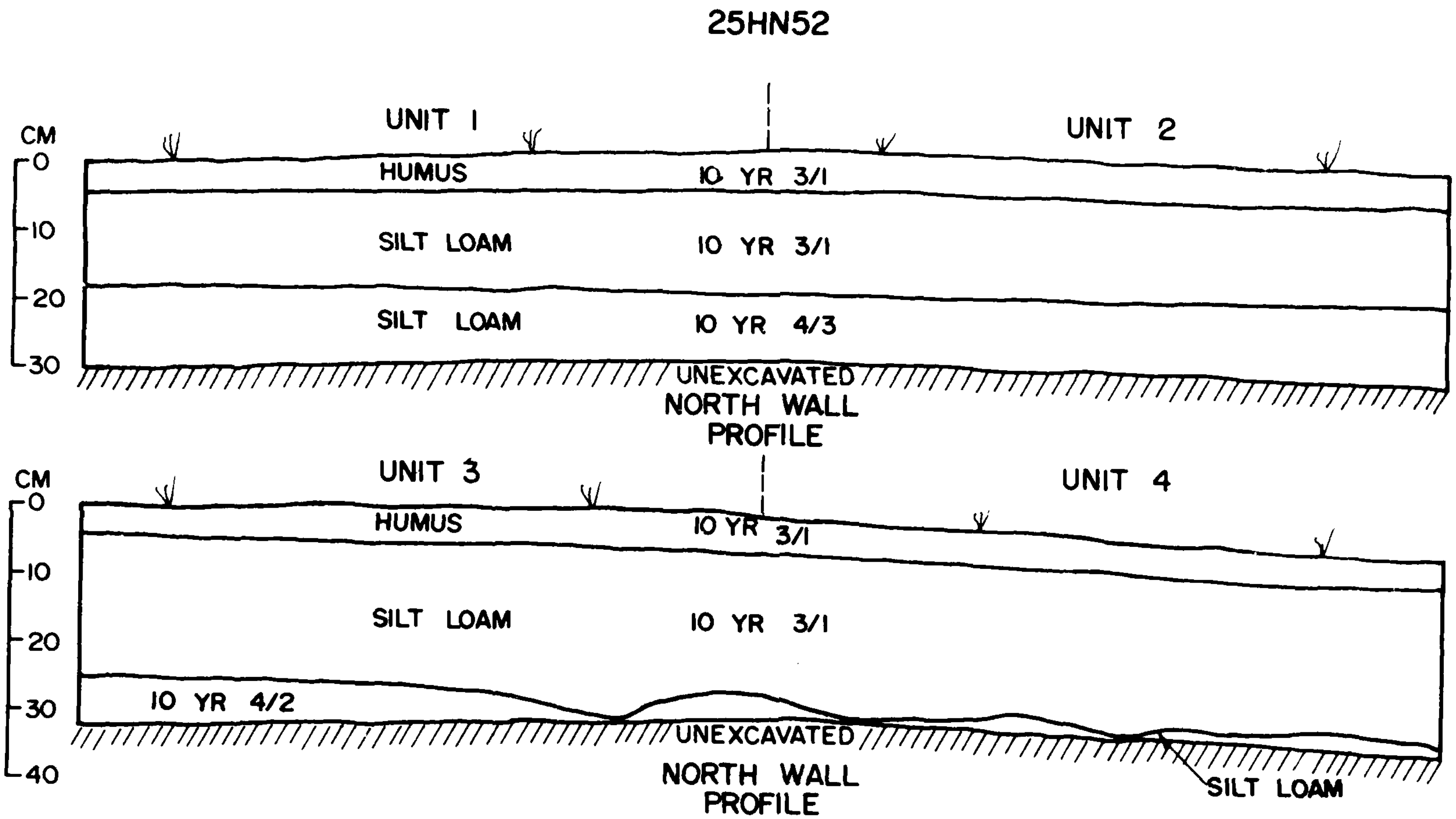


Figure 70. Profile of units 1, 2, 3, and 4 at site 25HN52.

25HN53

Figures	71 through 73
Site Type	Seasonal camp, historic townsite
Recorded	1977, University of Nebraska
Size	10,000 square meters
Cultural Affiliation	Unknown prehistoric, historic
Topographic Setting	Terrace
Name	Unnamed
Drainage	Mill Creek
Surface Visibility	10 percent

Previous Research

First recorded in 1977 by the University of Nebraska, Lincoln, this site was originally described as existing on a beach and mud flat area within the nor'h Cove Public Use Area. Periodically subjected to inundation at the multipurpose pool level, it was recommended for field evaluation to determine the nature and extent of the remaining deposits (Pepperl and Falk 1979). Five lithic fragments were noted at the time over an area of approximately 50 square meters.

The site was investigated in 1979-1980 and several projectile point fragments, jasper flakes, scraper and bone fragments were recovered from the beach. Shovel and auger tests, however, failed to recover any cultural material below the surface. The authors concluded that "It is more likely that the site has been inundated and cultural material found had been washed onto the beach" (Roetzel et al. 1982:101).

1985 Investigations

Investigations consisted of examination of the cut bank for the presence of cultural materials and the manual excavation of two 1 X 2 meter units and a backhoe trench (Figs. 71 through 73). Examination of the cut bank indicated cultural materials were buried in the terrace deposits that were subsequently being eroded by wave action. Consequently, the site does not occur on the beach as previously proposed by Pepperl and Falk (1979) and Roetzel et al. (1982). Manual excavations were done in arbitrary 10 cm levels. Units 1 and 2 were dug to a depth of 30 cm and units 3 and 4 were dug to 50 cm (Fig. 72). The backhoe trench was dug to a depth of 150 cm (Fig. 73). A plow zone was discernible at 15 cm to 20 cm. Units 1 and 2 had a gravel lense at approximately 15 cm to 20 cm (Fig. 72). Most cultural remains, both prehistoric and historic, were from the uppermost 20 cm (Table 45). The complete mixing of historic artifacts with the prehistoric artifacts indicates the prehistoric occupation has been completely destroyed by recent occupations. A steel ring and wing nut were recovered from unit 2 at a depth of 10-20 cm. The site is on the western edge of the old Republican City townsite. The presence of gravel in units 1 and 2 is likely due to an old road. Examination of the backhoe trench and cut bank on the south edge of the site did not reveal evidence for deeply buried cultural horizons.

Interpretations

Site 25HN53 is probably a hunting and gathering camp. The absence of a midden and shallowness of prehistoric remains indicate the site was not used intensively. Rather, it was probably a seasonal hunting and gathering camp. Its location would have provided a good view of the Republican River Valley, making it an ideal hunting and gathering camp. Because culturally diagnostic artifacts have not been recovered from the site, cultural affiliation is not known. The site is being destroyed on its south edge by extensive shoreline erosion.

Recommendations

Site 25HN53 does not appear to have any in situ prehistoric cultural remains. The south edge of the site is being destroyed by extensive shoreline erosion. The rest of the site has been severely disturbed by the former old townsite of Republican City. The presence of a probable gravel road through the site (i.e., test units 1 and 2) in addition to the mixing of historic artifacts with the prehistoric artifacts attest to the site's destruction. Investigations in 1985 recovered few cultural materials with an absence of any culturally diagnostic artifacts. The authors do not believe the site contains significant scientific data that could elucidate the culture history of the region. Consequently, the authors do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 45

25HN53
Artifacts

Unit 1	flakes	blades	potlids	shatter	historic
0-10 cm					
10-20 cm	2			1	5 sheet metal
20-30 cm					
Unit 2					
0-10 cm				1	
10-20 cm					1 metal ring, 1 metal wingnut
20-30 cm					
Unit 3					
0-10 cm					
10-20 cm					
20-30 cm					
30-40 cm					
40-50 cm					
Unit 4					
0-10 cm					
10-20 cm					
20-30 cm					
30-40 cm					
40-50 cm					
Totals	2			2	
Surface	5			3	

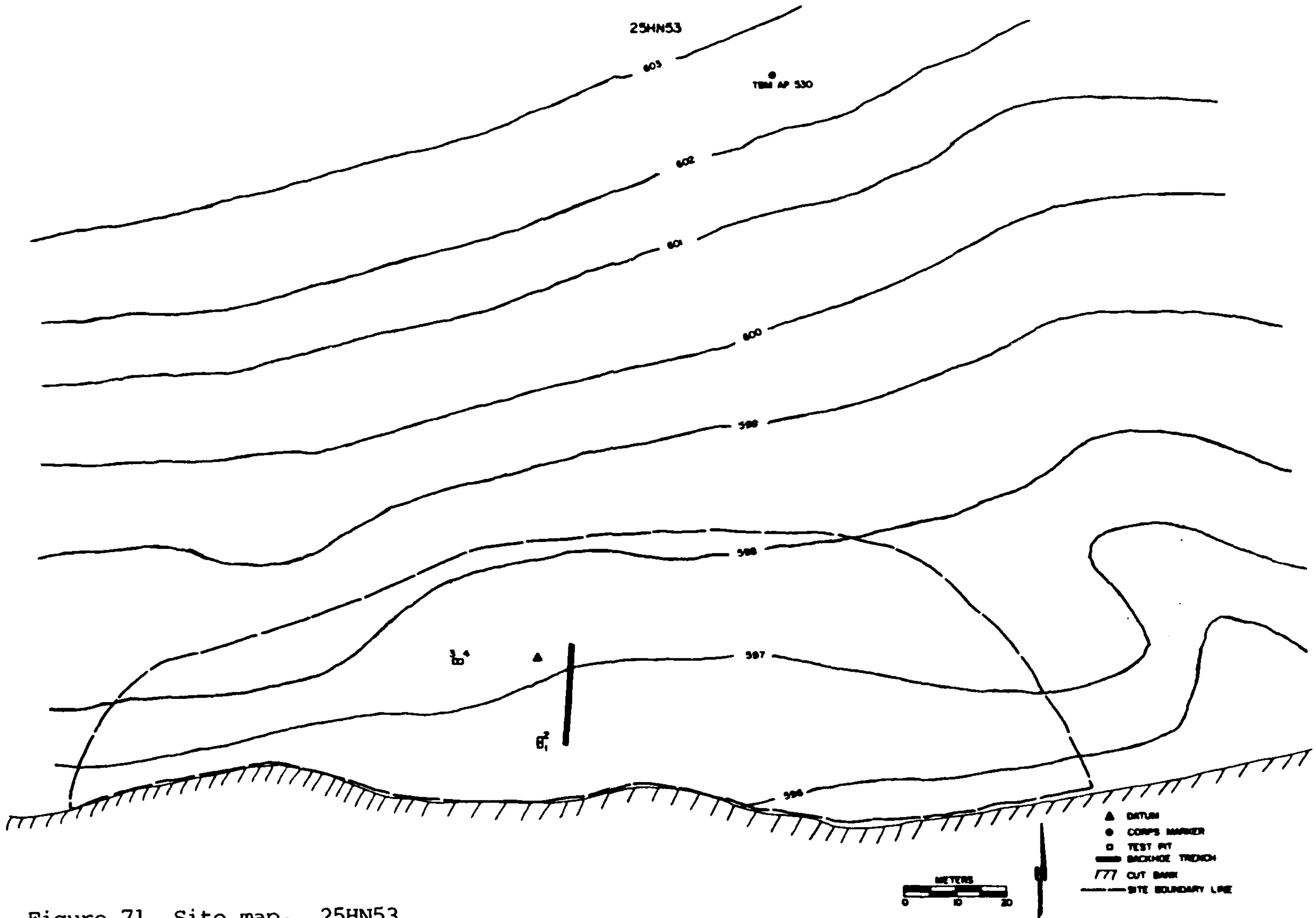


Figure 71 Site map, 25HN53

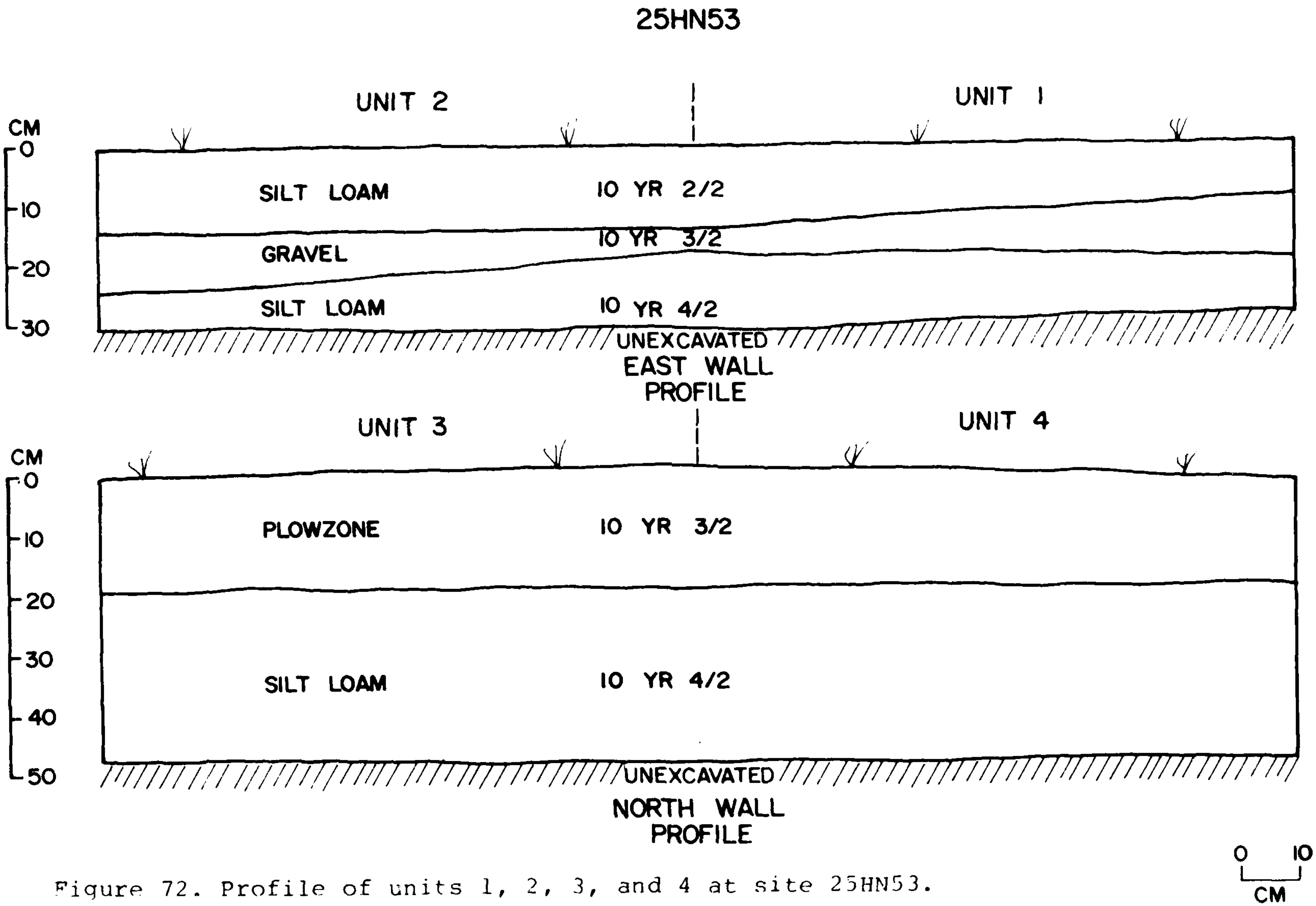


Figure 72. Profile of units 1, 2, 3, and 4 at site 25HN53.

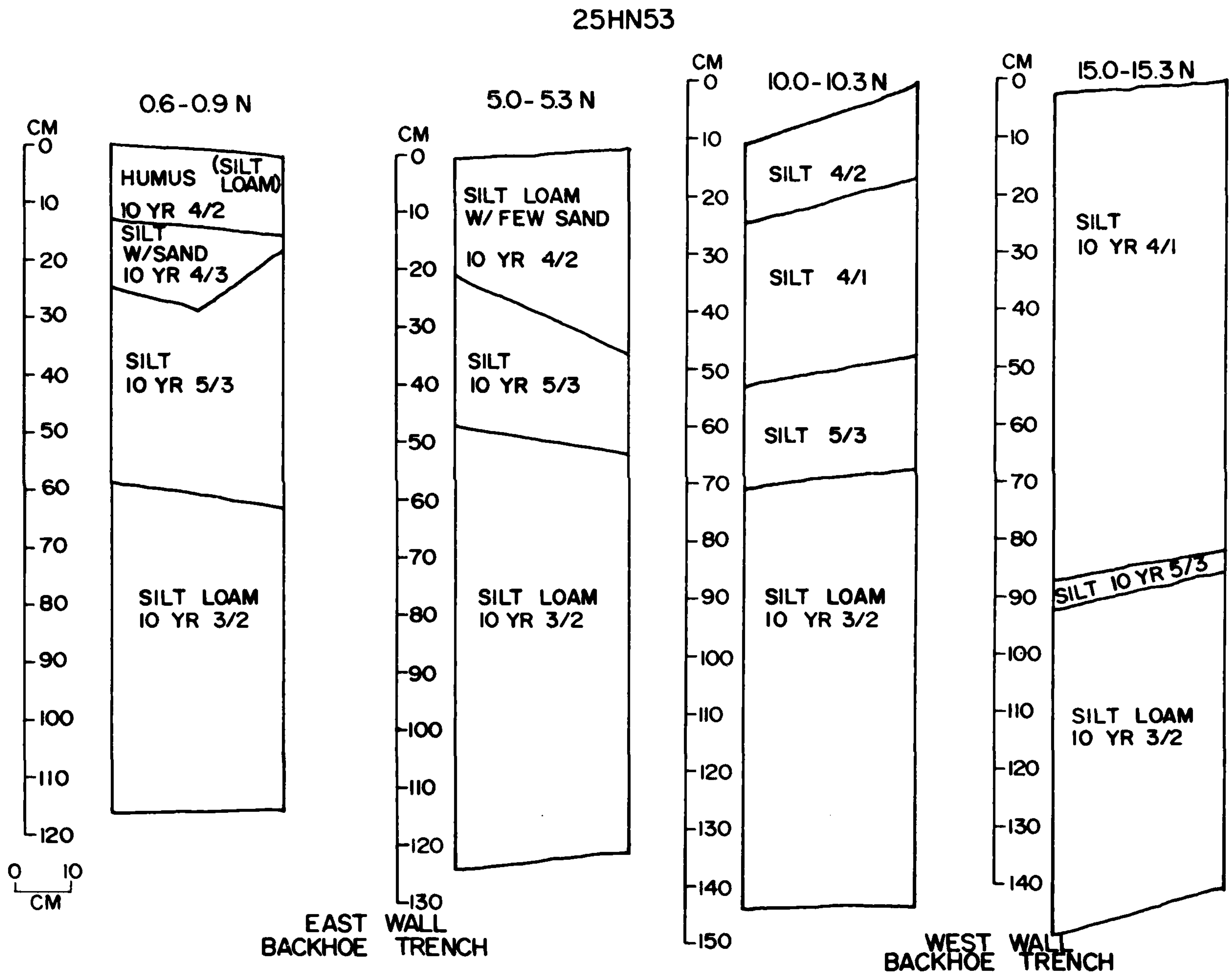


Figure 73. Profile of the backhoe trench at site 25HN53.

25HN54

Figures	74 and 75
Site Type	Unknown
Recorded	1977, University of Nebraska
Size	1,800 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Cut bank
Name	Unnamed
Drainage	Republican River
Surface Visibility	10 percent

Previous Research

This site was first described during the 1977 survey as being located on a beach within the normal pool level shoreline. (The site is actually located on top of a high cut bank). Lithics and bone fragments were noted over an area of approximately 1,000 square meters (Pepperl and Falk 1979). No cultural affiliation could be assigned at the time.

The 1979-1980 investigations focused on defining the vertical and horizontal extent of the site and the cultural affiliation. A ground surface reconnaissance recovered 180 artifacts, including scrapers, drills, flakes, ceramics, and a tooth fragment. The ceramic design suggested an Upper Republican occupation. Subsurface shovel and auger tests were not as successful in recovering cultural material. The exact size of the site was not determined, since the authors felt that erosion was perhaps totally responsible for the occurrence of artifacts on the beach (Roetzel et al. 1982).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units placed on top of the cut bank (Figs. 74 and 75). Excavations were done in arbitrary 10 cm levels. Units 1 and 4 were dug to a depth of 20 cm and units 2 and 3 were dug to 30 cm. The only artifact recovered from excavations was a small flake from the 10-20 cm level in unit 3 (Table 46). Although a few artifacts were collected from the beach, the site appears to have been almost completely destroyed by extensive shoreline erosion. Artifacts recovered from the beach include two bifacially flaked knives, one complete and the other having the distal end missing. A biface resharpening flake and piece of tested chert were also recovered. A few animal bones were also collected from the beach (Table 47).

Interpretations

Because of extensive shoreline erosion, it is difficult to make meaningful interpretations regarding the site. It was probably a seasonal hunting and gathering camp for Upper Republican peoples. The few faunal remains (Table 47) are all from the beach and some Pleistocene fauna (e.g., Proboscidea) are present in the collection.

Recommendations

Site 25HN54 has been destroyed by extensive shoreline erosion. Investigations recovered few cultural remains and no diagnostic materials. The authors do not believe the site contains significant scientific data that would help elucidate the prehistory of the region. The authors, therefore, do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 46

25HN54
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds
0-10 cm					
10-20 cm					
Unit 2					
0-10 cm					
10-20 cm					
20-30 cm					
Unit 3					
0-10 cm					
10-20 cm	1				
20-30 cm					
Unit 4					
0-10 cm					
10-20 cm					
Totals	1				
Surface (beach)	79			21	2

Table 47

Taxonomic Composition of Vertebrate Remains Recovered From the Beach at Site 25HN54

Taxon	common names	NISP	MNI
AVES (NISP=1)	Birds		
Anatidae	Swans, Geese, Ducks		
Chen caerulescens	Snow goose	1	1
MAMMALIA (NISP=7)	Mammals		
Cervidae	Wapiti, Deer		
cf. *Odocoileus* sp.	Deer	1	1
Bovidae	Bison, Cows		
Bison sp.	Bison	3	1
Wapiti or Bison		2	-
Proboscidea	Mastodonts, Elephants	1	1
Indeterminate mammal	(N=17)	-	-
TOTAL		8	4

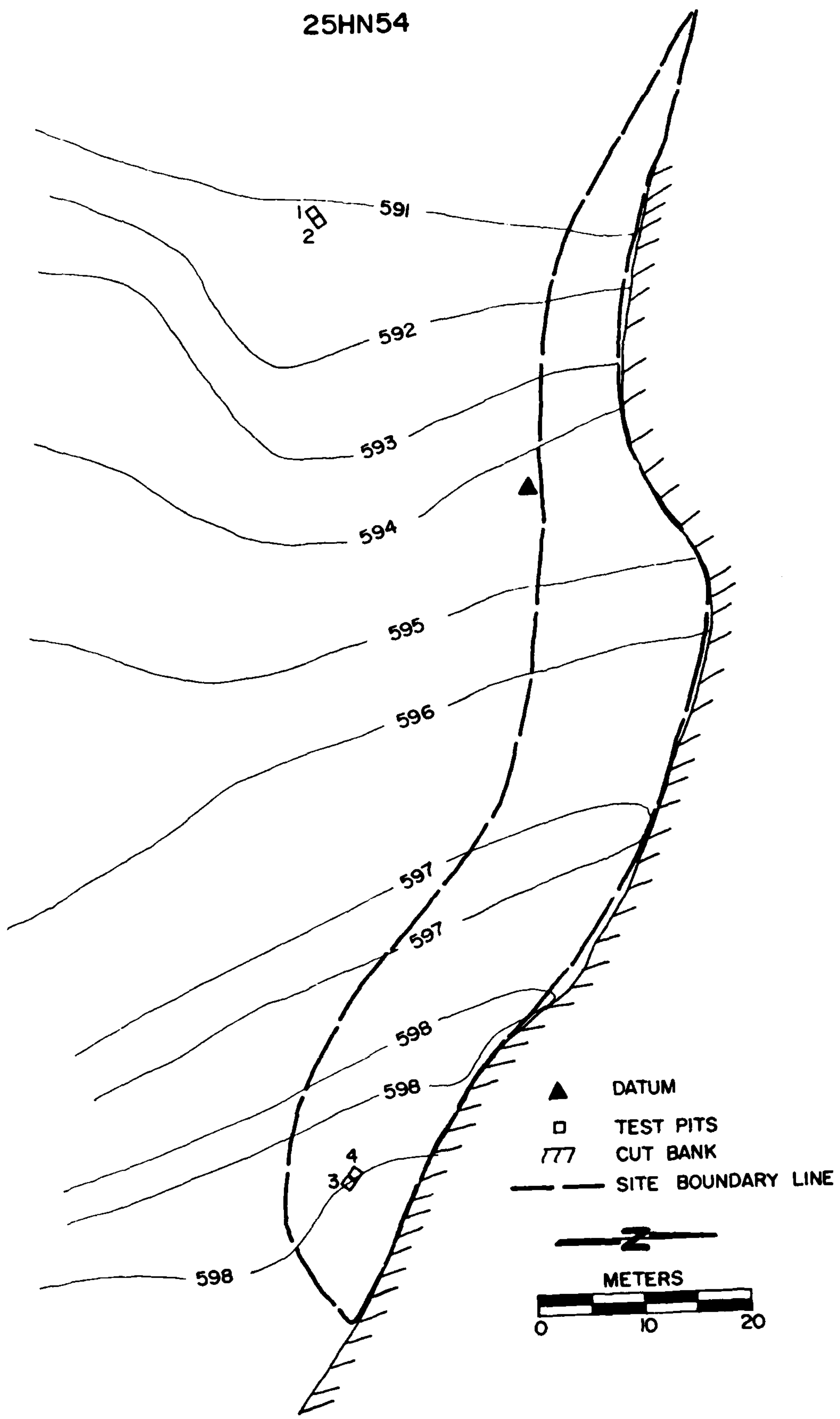


Figure 74 Site Map, 25HN54

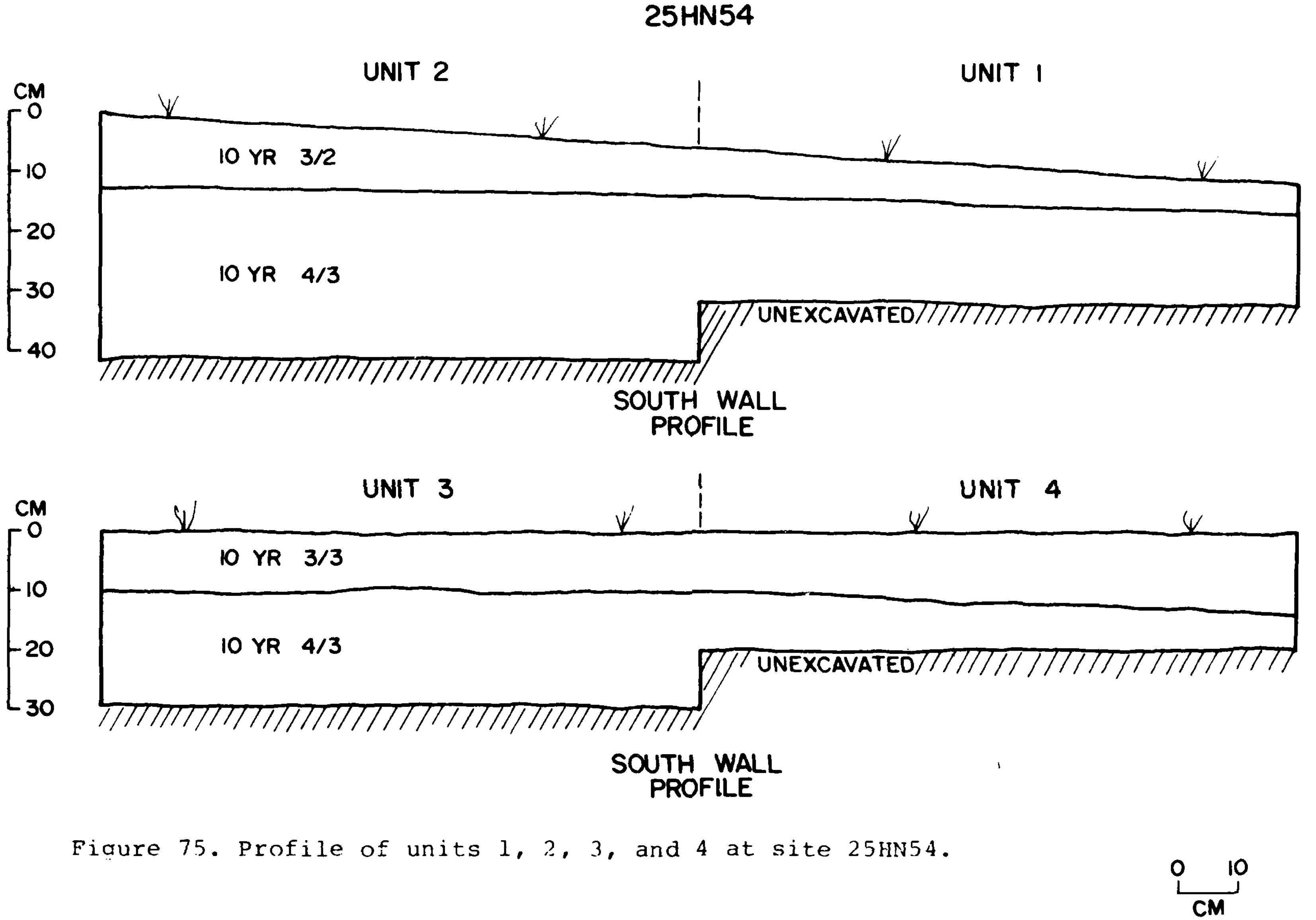


Figure 75. Profile of units 1, 2, 3, and 4 at site 25HN54.

25HN57

Figures	76 and 77
Site Type	Unknown
Recorded	1977, University of Nebraska
Size	1,000 square meters
Cultural Affiliation	Paleo-Indian, Early Archaic, Upper Republican, Dismal River, Historic
Topographic Setting	Beach
Drainage	Prairie Dog Creek
Surface Visibility	10 to 100 percent

Previous Research

This site, initially recorded in 1977, was described as a continuous scatter of lithic and ceramic fragments over an area 30 X 200 meters (Pepperl and Falk 1978). The site is located on a former high terrace of Prairie Dog Creek. At least one surface collection had been made at the site prior to professional investigations, since 17 artifacts from a private collection are curated at the University of Nebraska, Lincoln.

The 1979-1980 investigations consisted of a surface reconnaissance, shovel and auger testing and cut bank planing. Artifacts recovered represented several cultural occupations, including Upper Republican, Dismal River, historic and a possible Paleo-Indian or Early Archaic component. The authors (Roetzel et al. 1982:119) state, however, that this site may be a continuation of 25HN37, as originally suggested by Pepperl and Falk (1978:35). Otherwise, they were unable to determine whether the recovered artifacts had eroded from the cut bank or were redeposited on the beach by wave action.

Given the multicomponent nature of the site, plus the fact that so few preceramic occupations had been identified for Harlan County, this site was somewhat unique. The 1985 investigations proposed to more thoroughly examine the subsurface and cut bank deposits in order to determine the nature and extent of the deposits.

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units (Figs. 76 and 77). The site was located on the beach during the month of August and had recently been inundated prior to field investigations. There is no cut bank associated with the site, consequently cut banks could not be field checked. Units 2 and 4 were dug to a depth of 10 cm, unit 1 was dug to 25 cm and unit 3 was dug to 20 cm (Table 48). The surface soil (i.e., A horizon) has been completely removed by wave action and has been replaced by sand (Fig. 77). Underlying the sand is clay that contains no cultural remains. Excavation of unit 1 to 25 cm reached water table. All artifacts and faunal remains (Table 49) were recovered from the sand. Given the geomorphic setting and soil associations, deeper excavations were not warranted nor possible (i.e., shallow water table). A core was recovered from the beach and historic whiteware was recovered from units 2 and 4 from a depth of 0-10 cm.

Interpretations

Although the site is assigned to many possible prehistoric occupations, test excavations did not reveal any in situ remains. Site interpretations can not be made on the basis of available information. Because of total site destruction by wave action, interpretations cannot be forthcoming from further research.

Recommendations

Site 25HN57 has been completely destroyed by wave action and seasonal inundation. There is no evidence that in situ cultural remains exist at the site. The authors, therefore, do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 48

25HN57
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds	rim sherds
0-15 cm	20			8		
15-25 cm	2					
Unit 2						
0-10 cm	12			3		
Unit 3						
0-10 cm	18	1	1	1	2	
10-20 cm						
Unit 4						
0-10 cm	21		2	5	3	
Totals	73	1	3	17	5	
Surface	9			1		1

Table 49

Taxonomic Composition of Vertebrate Remains From Site 25HN57 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
OSTEICHTHYES (NISP=5)	Bony Fish		
Cyprinidae	Minnows		
cf. *Cyprinus carpio*	Carp	1	1
Percidae	Perches		
cf. *Stizostedion vitreum*	Walleye	4	1
AVES (NISP=1)	Birds		
Anatidae	Swans, Geese, Ducks		
Branta canadensis	Canada goose	1	1
MAMMALIA (NISP=1)	Mammals		
Bovidae	Bison, Cows		
Bison bison	Bison	1	1
Indeterminate mammal (N=3)		-	-
TOTAL		7	4

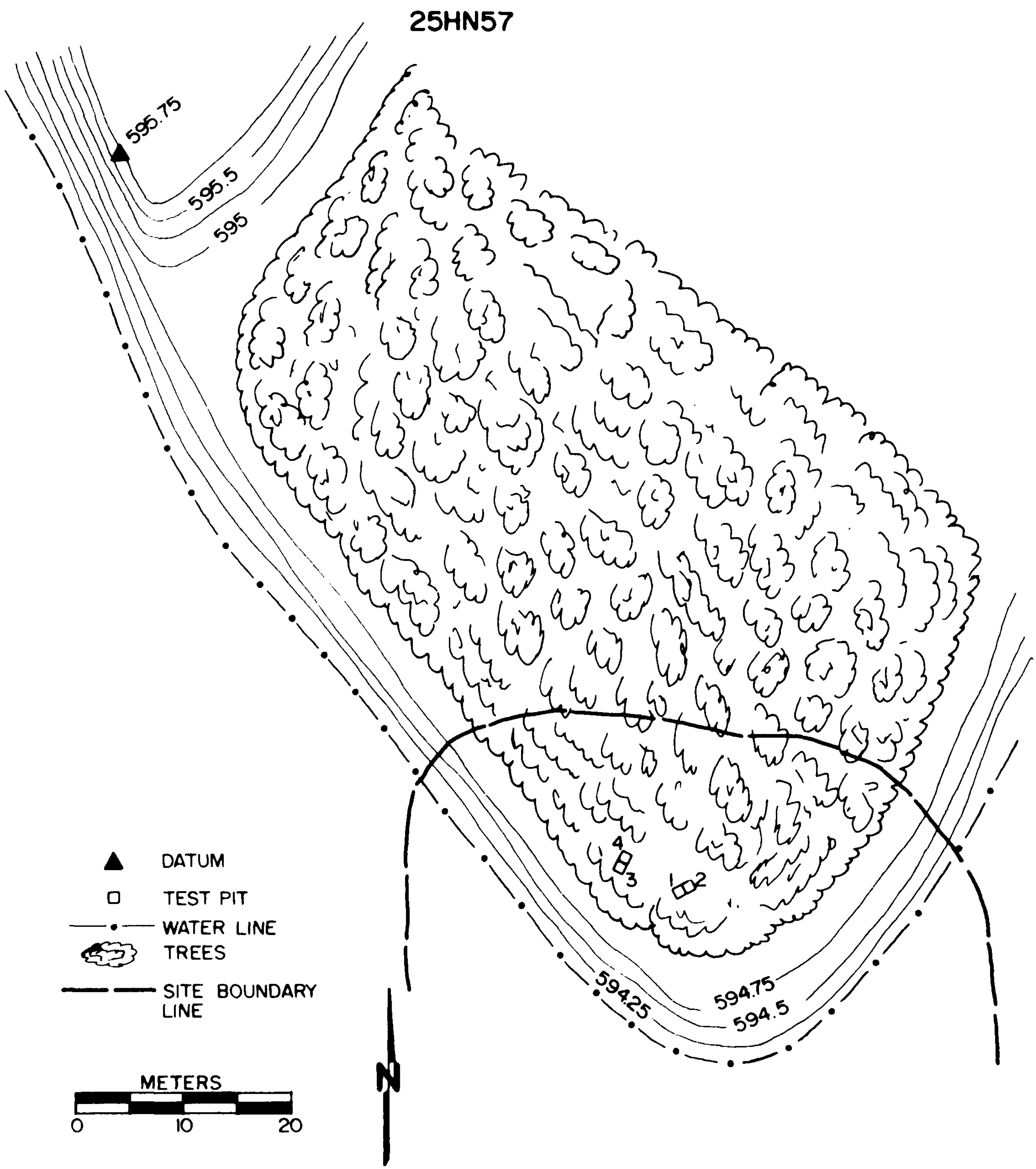


Figure 76. Site map of 25HN57.

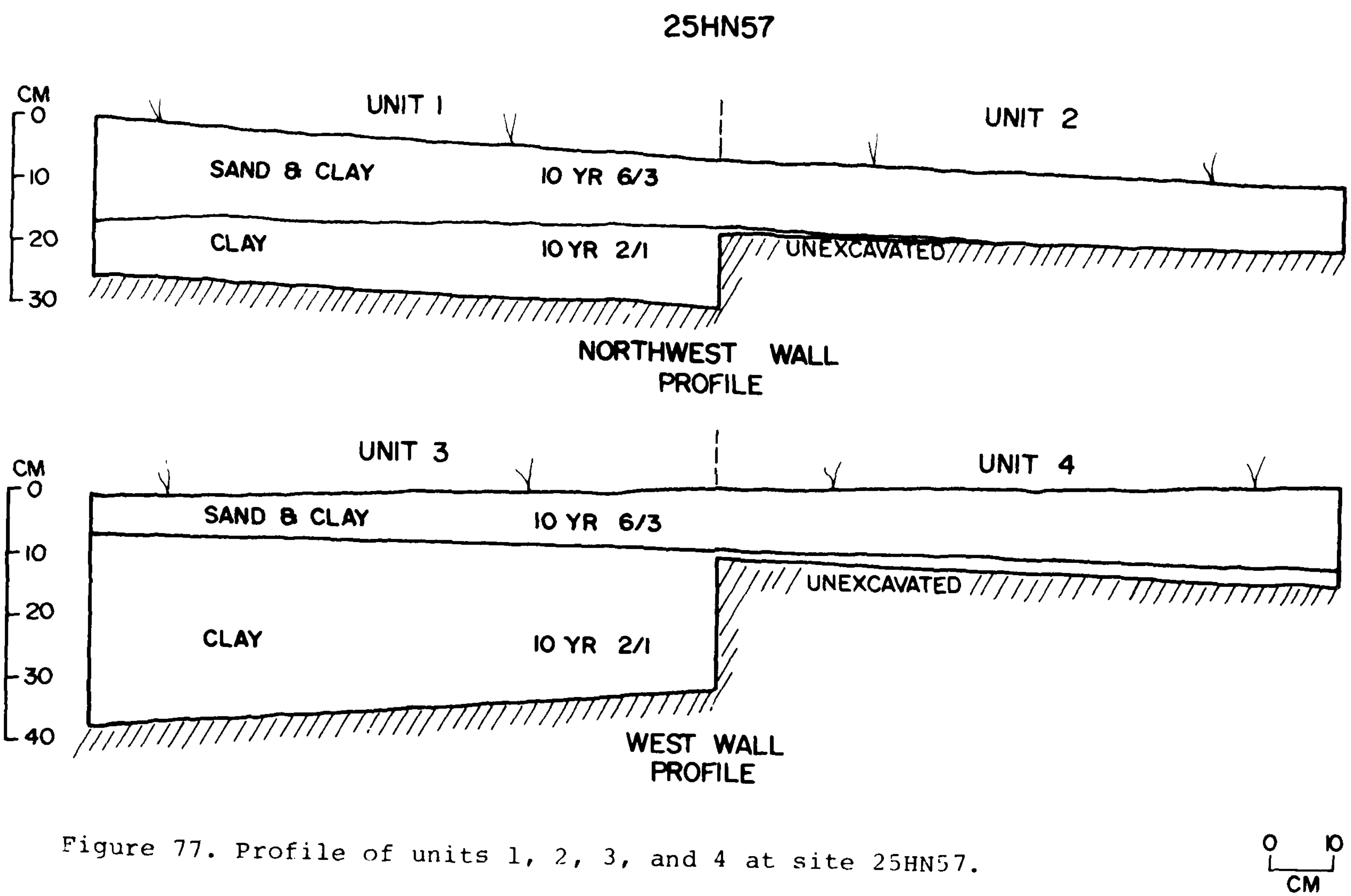


Figure 77. Profile of units 1, 2, 3, and 4 at site 25HN57.

25HN60

Figures	78 through 80
Site Type	Unknown
Recorded	1977, University of Nebraska
Size	4,000 square meters
Cultural Affiliation	Upper Republican
Topographic Setting	Terrace
Name	Unnamed
Drainage	Prairie Dog Creek
Surface Visibility	100 percent

Previous Research

Although this site was officially recorded in 1977, it may have been investigated as early as 1950 by field crews from the University of Nebraska, Lincoln. The site is located on a former high terrace of Prairie Dog Creek, not far from site 25HN12. According to 1950 field notes, crews working on 25HN12 located artifacts in the vicinity of what is now recorded as 25HN60. No description of the artifacts is included, however, and no further investigations were made at the site until 1977. Pepperl and Falk (1978) recorded the site as a lithic scatter about 1,800 square meters in size.

1985 Investigations

The proposed investigations for 1985 included manual testing, systematic augering and some backhoe trenching. These methods were outlined to address three issues: (1) a definition of the vertical and horizontal extent of the site; (2) a determination of cultural affiliation; and (3) an assessment of the amount of previous damage to the site (Adair and Brown 1985).

Investigations consisted of manual excavation of three 1 X 2 meter units and one backhoe trench (Figs. 78 through 80). Excavation of a 160 cm deep backhoe trench (Fig. 80) indicated cultural remains were confined to the plow zone. There was no evidence of deeply buried cultural horizons. The site, situated at the edge of a degrading terrace, has been subjected to extensive cultivation and erosion. Manual excavations were dug only through the plow zone that varied in depth from 17 cm to 32 cm (Fig. 79, Table 50). Two plow zones were delineated, with a more recent, shallow plow zone measuring approximately 10 cm in depth. Below the plow zones was a hard, compacted clay that was devoid of cultural remains. Two biface resharpening flakes were recovered from the plow zone from unit 5. One is complete and the other is missing its proximal and distal ends. A barb from a barbed-wire fence was recovered from unit 5. Artifacts recovered from the surface include a bifacially flaked knife and a bifacially flaked point/knife. Both are missing their proximal ends. A retouched flake was also recovered. The surface also yielded 11.8 grams of freshwater mussel shells. Pottery from the site (Table 50) indicates an Upper Republican occupation.

Interpretations

Site 25HN60 appears to have been an Upper Republican camp site. The low frequency of artifacts visible on the surface and the absence of a midden indicate the site was used for only short periods of time, probably as a seasonal hunting and gathering camp. If subsurface features exist, they have been truncated by plowing as evidenced by the nature of subsurface soils and depth of the lower plowzone.

Recommendations

Site 25HN60 has been severely disturbed by modern agricultural practices and slope erosion. Excavations indicate cultural remains do not occur below plow zone. Investigations recovered a low frequency of artifacts. Consequently, the authors do not believe the site contains significant scientific information that would help elucidate the prehistory of the region. The authors, therefore, do not recommend the site for consideration of potential eligibility for nomination to the National Register of Historic Places.

Table 50

25HN60
Artifacts

Unit	flakes	blades	potlids	shatter	body sherds	historic
Unit 1 0-32 cm						
Unit 2 0-35 cm						
Unit 3 0-17 cm	1					
Unit 4 0-30 cm	1					
Unit 5 0-30 cm	5			3	1	1 piece barbed wire
Unit 6 0-30 cm	2				1	
Totals	9			3	2	1
Surface	21			5		

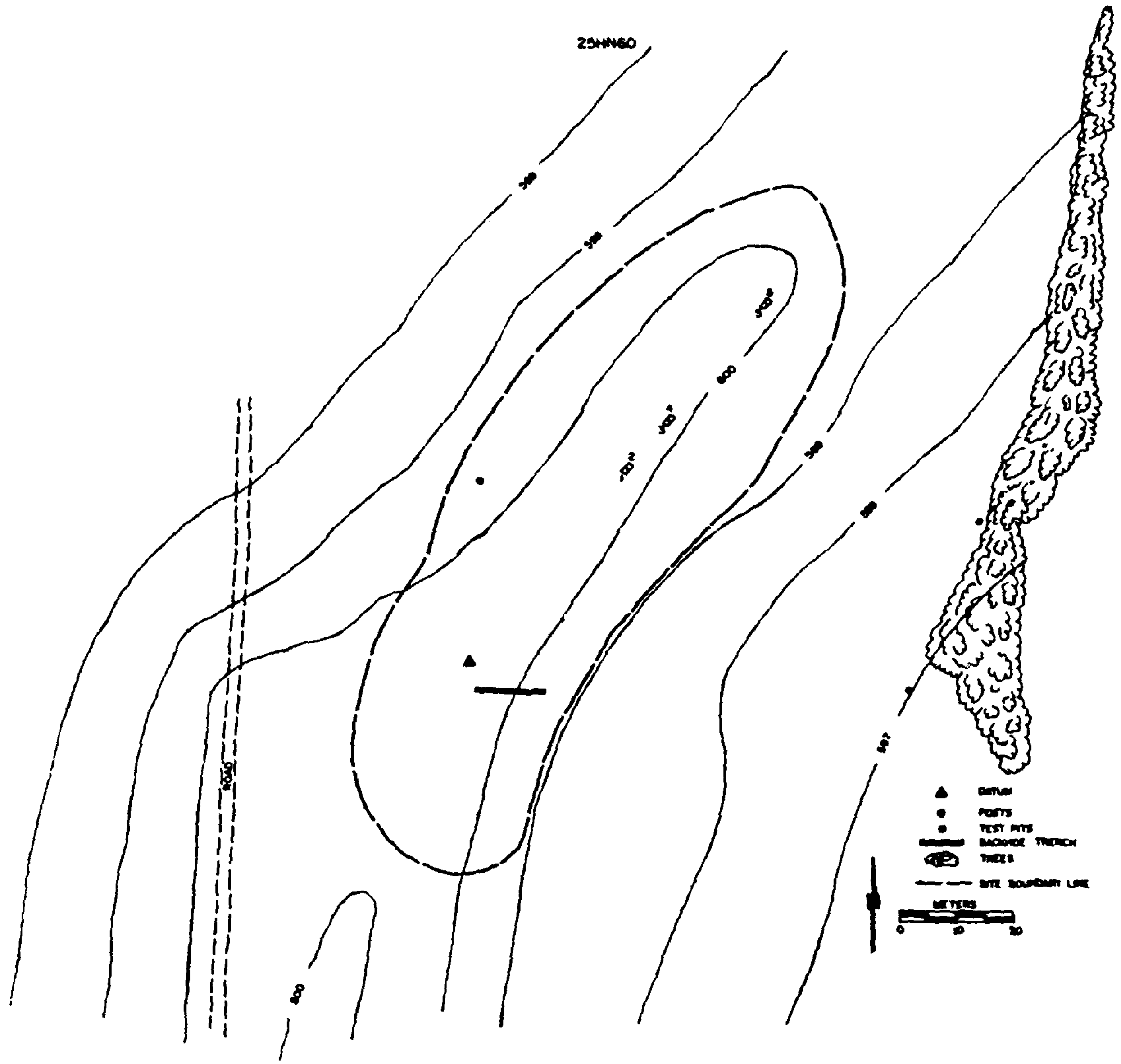


Figure 78   Site map, 25HN60

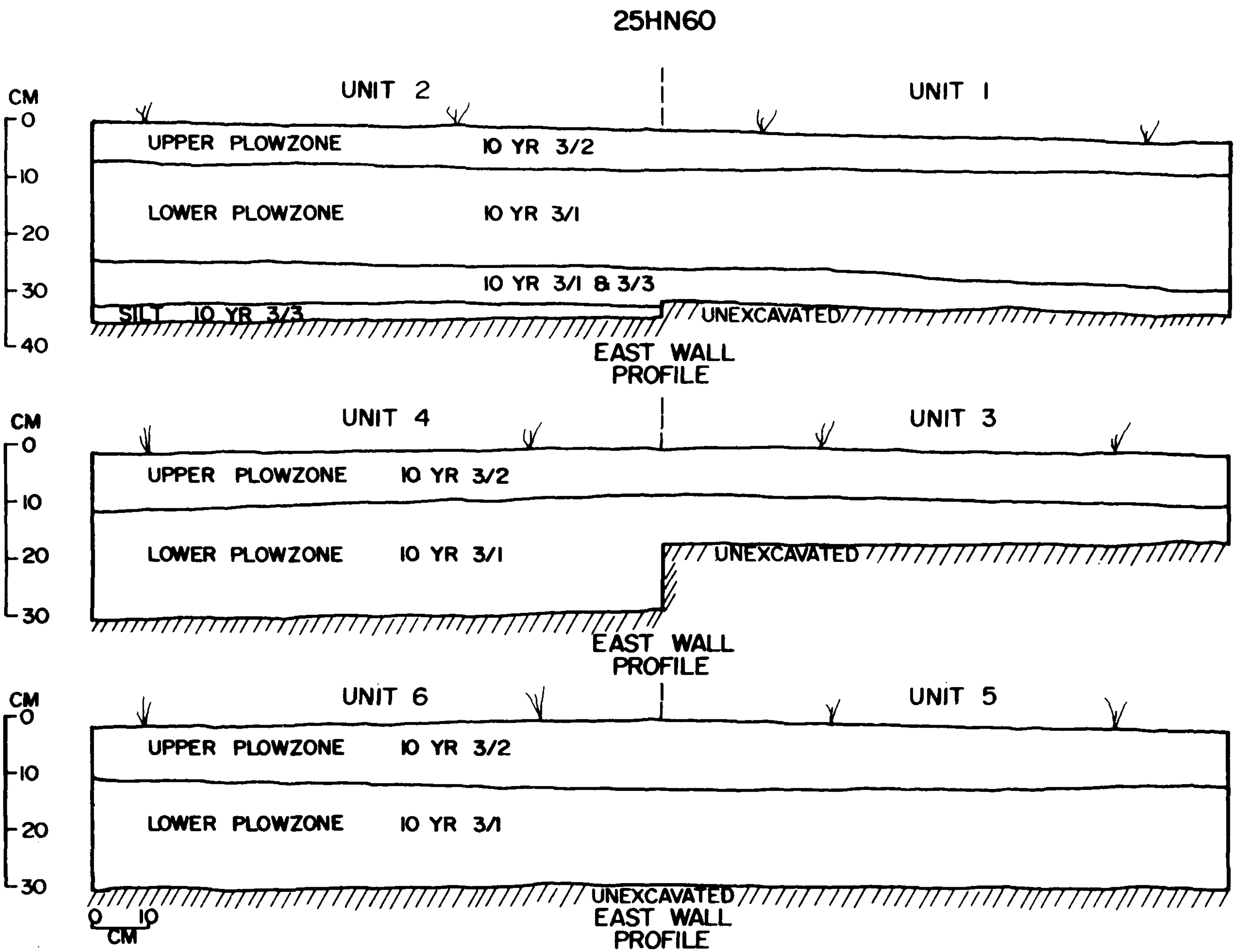


Figure 79. Profile of units 1, 2, 3, 4, 5, and 6 at site 25HN60.

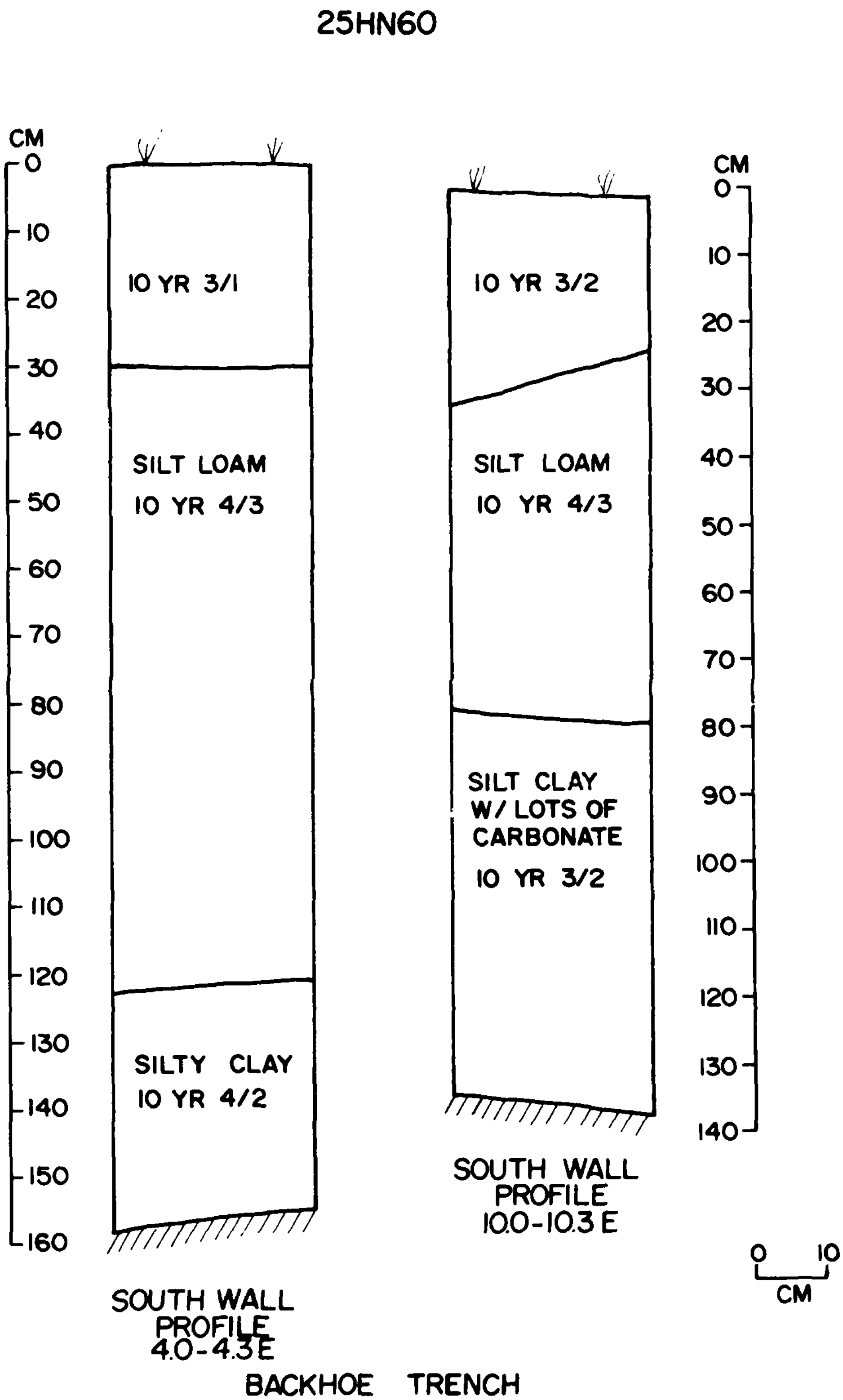


Figure 80. Profile of the backhoe trench at site 25HN60.

25HN61

Figures	81 through 83
Site Type	Unknown
Recorded	1977, University of Nebraska
Size	6,000 square meters
Cultural Affiliation	Unknown
Topographic Setting	Ridge
Name	Unnamed
Drainage	Bone Creek
Surface Visibility	10 percent

Previous Research

When this site was recorded in 1977, chipped stone flakes and fragments were observed along a dirt road that traverses the site (Pepperl and Falk 1978). Its location along a high ridge places it in a topographic setting similar to 25HN5, Graham Ossuary. Heavy grass cover precluded a closer examination of the site in 1977 so the size and nature of the site could not be determined.

1985 Investigations

Investigations proposed for 1985 (Adair and Brown 1985:53) included the manual excavation of several test units to determine the depth of deposits, systematic auger testing to ascertain the vertical extent of the site, and backhoe trenching to search for buried deposits. Cultural affiliation, site integrity and site type were also issues addressed by these techniques.

Investigations consisted of manual excavation of two 1 X 2 meter units and one backhoe trench (Figs. 81 through 83). Manual excavations were done in arbitrary 10 cm levels. Unit 1 was dug to a depth of 20 cm and units 2, 3 and 4 were dug to 30 cm. Excavations indicated the presence of probable virgin prairie. All artifacts were recovered from 0-10 cm (Table 51). The loess soils are indicative of a relatively stable ground surface. The backhoe trench, dug to a depth of 160 cm (Fig. 83) did not reveal evidence of deeply buried cultural horizons but, rather, confirmed the relative stability of the ground surface for the past several thousand years.

Interpretations

No culturally diagnostic artifacts have been observed or recovered from the site. The only faunal remains, those of the ornate box turtle (*Terrapene ornata*), were recovered from the surface and are considered intrusive. The site location suggests its use as a seasonal hunting and gathering camp. Its exposure to the elements (i.e., situated on a high ridge) would not have made it conducive for occupation during the winter months. The site has an excellent view of the Republican River Valley that would have made it advantageous for use as a hunting camp.

Recommendations

Site 25HN61 has a vehicular trail that bisects its length on top of a ridge (Fig. 81). Observation of a very thin surface scatter of cultural remains indicates the site is long and narrow in size. Excavations show the cultural remains are within the uppermost 10 cm of loess. Because of the paucity of artifacts recovered and the absence of diagnostic material in addition to site destruction caused by a dirt road and extensive rodent burrowing, the authors do not believe the site contains significant scientific data that would help elucidate the culture history of the region. The authors, therefore, do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 51

25HN61
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds
0-10 cm	9			10	
10-20 cm					
Unit 2					
0-10 cm	12			9	
10-20 cm					
20-30 cm					
Unit 3					
0-10 cm					
10-20 cm					
20-30 cm					
Unit 4					
0-10 cm				1	
10-20 cm					
20-30 cm					
Totals	23			22	
Surface	18			9	

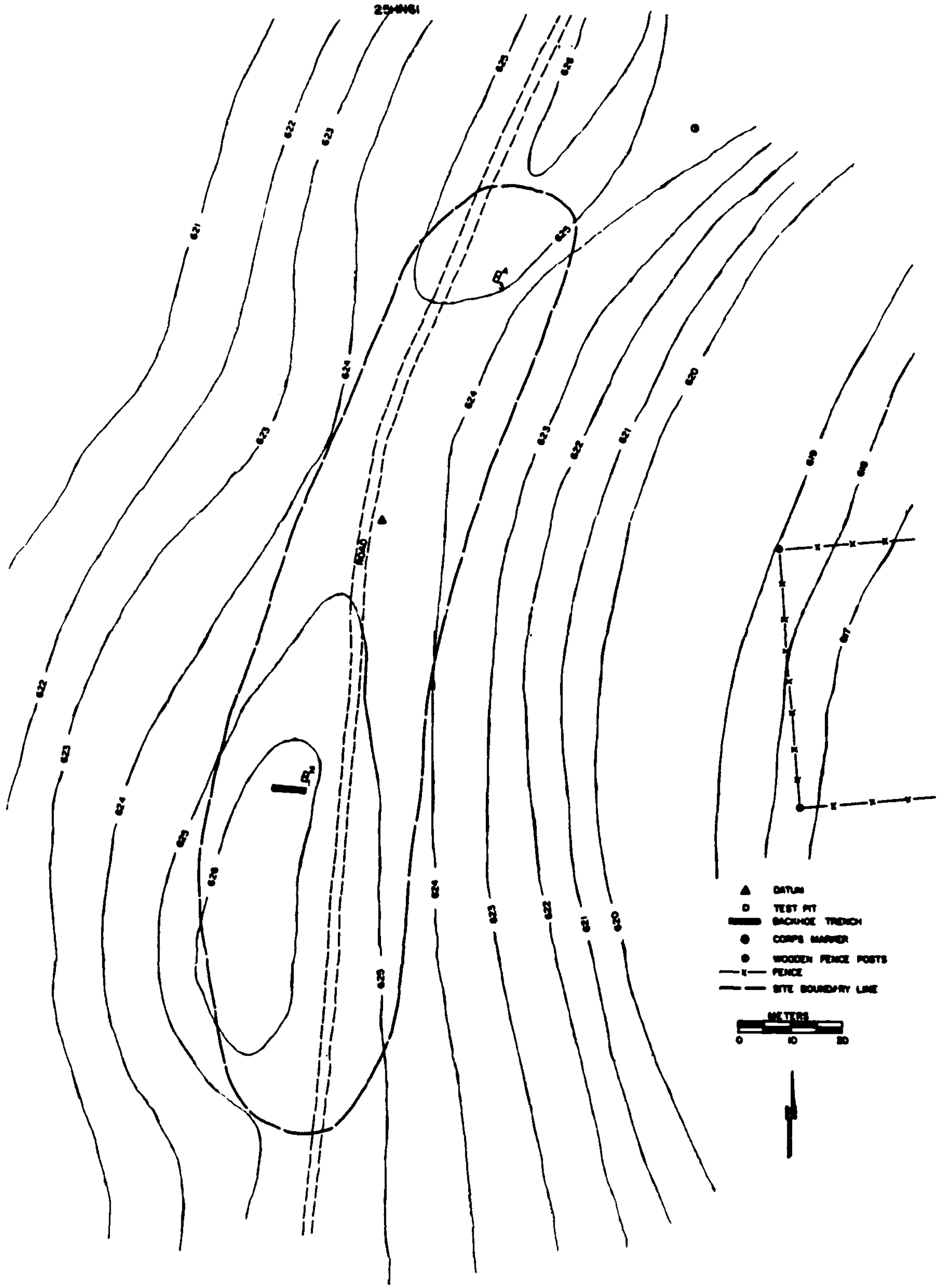


Figure 81   Site map, 25HN61

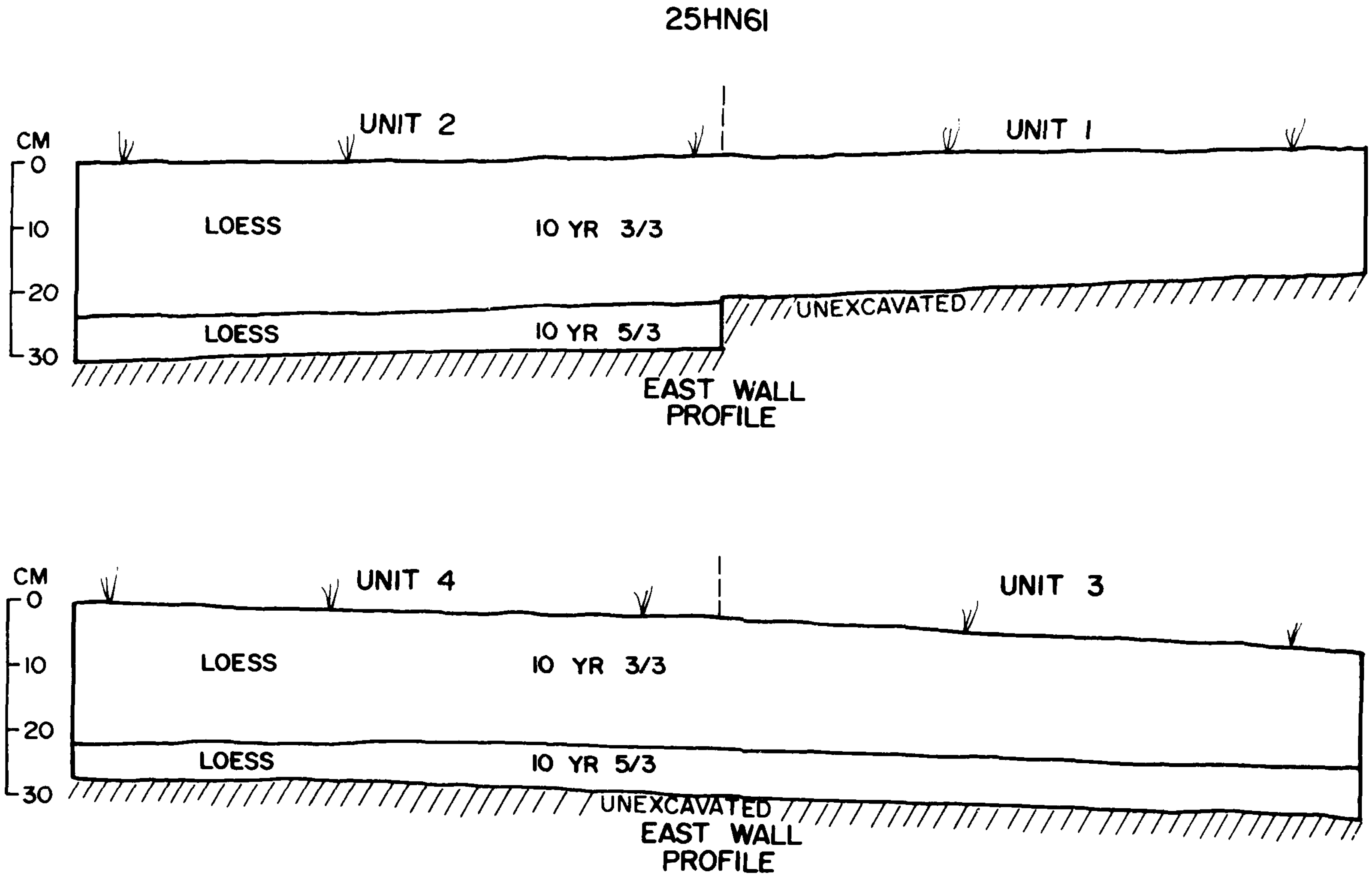


Figure 82. Profile of units 1, 2, 3, and 4 at site 25HN61.

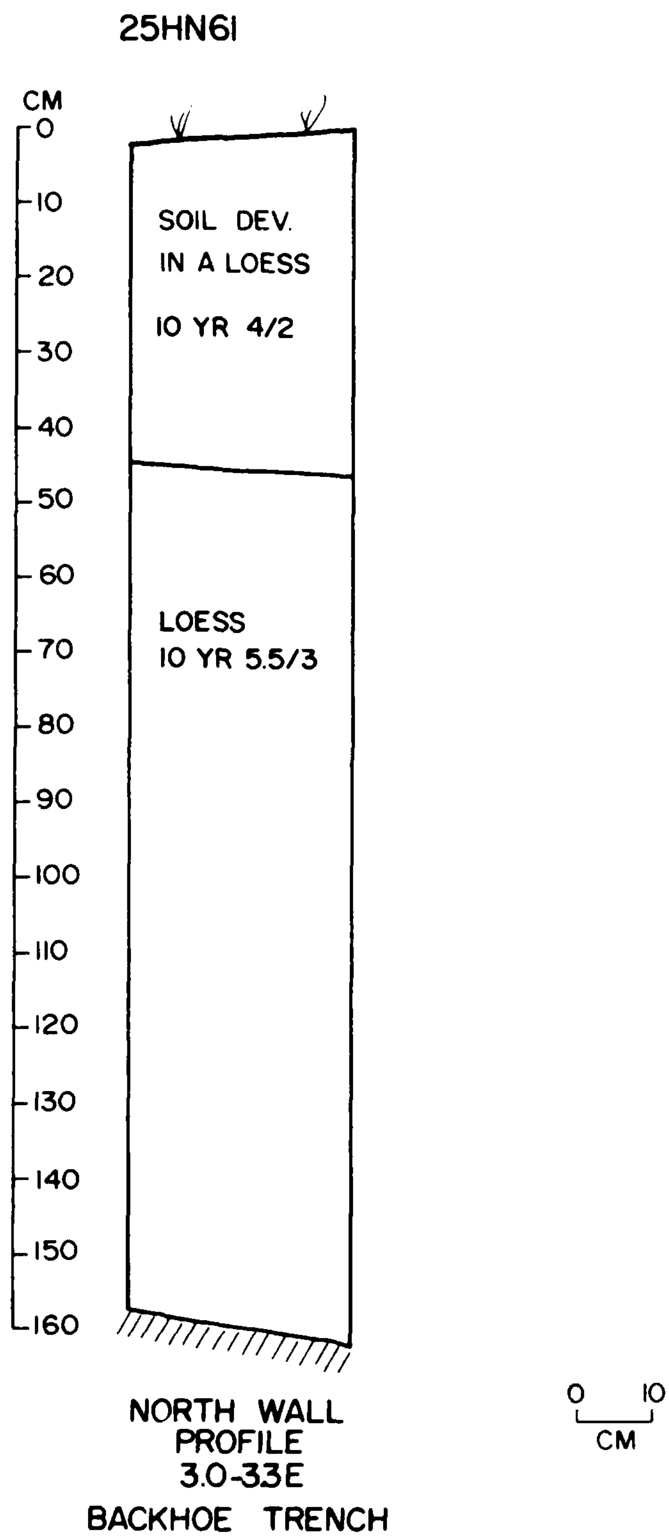


Figure 83. Profile of the backhoe trench at site 25HN61.

25HN62

Figures	84 through 87
Site Type	Unknown
Recorded	1977, University of Nebraska
Size	3,000 square meters
Cultural Affiliation	Unknown
Topographic Setting	Terrace
Name	Unnamed
Drainage	Prairie Dog Creek
Surface Visibility	10 to 100 percent

Previous Research

This site was observed in 1977 as three areas of lithic scatters situated close enough to be considered one site (Pepperl and Falk 1978:38). It is located on the edge of a broad high terrace south of the former channel of Prairie Dog Creek. Estimated site size is 3,000 square meters.

Because the site has never been subjected to subsurface investigation, techniques proposed for this project focused on determining cultural affiliation, vertical and horizontal dimensions, integrity of the deposits and nature of the occupation. To attain these goals, manually excavated test units, systematic auger tests, and an examination of an adjacent cut bank were proposed (Adair and Brown 1985:55).

1985 Investigations

Investigations consisted of manual excavation of four 1 X 2 meter units and examination of the cut bank on the north side of the site (Figs. 84 through 87). Manual excavations were in arbitrary 10 cm levels. Units 1, 2, 4, 6, 7 and 8 were dug to a depth of 20 cm, unit 3 was dug to 30 cm and unit 5 was dug to 40 cm. Almost all cultural remains, both prehistoric and historic, were recovered from the uppermost 20 cm (Tables 52 and 53). The site is in cultivation with only a small grassy strip bordering the north margin of the site. Examination of the cultivated field and test excavations indicate the greatest concentration of cultural remains is in the easternmost portion of the site, in the area of test units 7 and 8. Examination of the cut bank (Fig. 87) did not reveal evidence of deeply buried cultural horizons.

Interpretations

Test excavations recovered several small triangular arrow points from units 7 and 8 (Table 53). Although no ceramics were recovered, the projectile points suggest an Upper Republican or more recent Plains Village (e.g., Pawnee, Apache) occupation. A few faunal remains were recovered (Table 54). The artifact inventory suggests the site was a seasonal hunting and gathering camp. The absence of a midden indicates the site was not intensively used. Most likely, it was occupied on a seasonal basis for only short periods of time.

Recommendations

Site 25HN62 has been severely disturbed by modern agricultural practices. Test excavations and examination of the cut bank indicate cultural remains do not extend below the plow zone. Consequently, the authors do not believe the site contains significant scientific data that would help elucidate the prehistory of the region. The authors, therefore, do not recommend the site for consideration of potential eligibility for nomination to the National Register of Historic Places.

Table 52

25HN62
Artifacts

Unit 1	flakes	blades	potlids	shatter	historic
0-10 cm					
10-20 cm	4			1	
Unit 2					
0-10 cm	1				
10-20 cm					
Unit 3					
0-10 cm					
10-20 cm					
20-30 cm					
Unit 4					
0-10 cm					
10-20 cm					
Unit 5					
0-10 cm					5 bottle caps
10-20 cm				2	
20-30 cm	5			3	
30-40 cm	1				
Unit 6					
0-10 cm					2 bottle caps
10-20 cm					
Unit 7					
0-10 cm	130		5	45	3 glass, 2 aluminum tabs
10-20 cm	19	1	1	12	
Unit 8					
0-10 cm	216		9	72	1 glass
10-20 cm	6	1		6	
Totals	382	2	15	382	13
Surface	39		1	15	

Table 53
25HN62
Tools

artifact	unit/level	description
projectile point	7 / 0-10 cm	small triangular shaped, corner notched, tip and base are missing, biface
projectile point	7 / 0-10 cm	small triangular shaped, corner notched, one side of blade missing, biface
projectile point	7 / 0-10 cm	small triangular shaped, corner notched, tip and barb missing, biface
projectile point	8 / 0-10 cm	small triangular shaped, corner notched, tip and base missing, biface
point/knife	8 / 0-10 cm	small triangular shaped, base missing, biface
knife	8 / 0-10 cm	triangular shaped, complete, biface
bifacial resharpening flakes	7 / 0-10 cm surface	complete complete
end scraper	7 / 0-10 cm	sub-triangular shaped, plano-convex, complete, uniface
drill/graver	7 / 0-10 cm	alternately beveled, biface, complete
retouched flakes (2)	7 / 0-10 cm 8 / 0-10 cm	uniface uniface
metal bottle caps (7)	5 and 6/ 0-10 cm	complete
aluminum pull tabs (2)	7 / 0-10 cm	complete
bottle glass, clear amber	7 / 0-10 cm 8 / 0-10 cm	
burned earth		14.1 grams total
sandstone		1.0 grams total

Table 54

Taxonomic Composition of Vertebrate Remains From Site 25HN62 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
MAMMALIA (NISP=6)	Mammals		
Cricetidae	New World Rats and Mice		
Microtus ochrogaster	Prairie vole	3	1
Cervidae	Wapiti, Deer		
cf. *Odocoileus* sp.	Deer	1	1
Deer-size		1	-
Bison-size		1	-
Indeterminate mammal (N=83)		-	-
TOTAL		6	2

25HN62

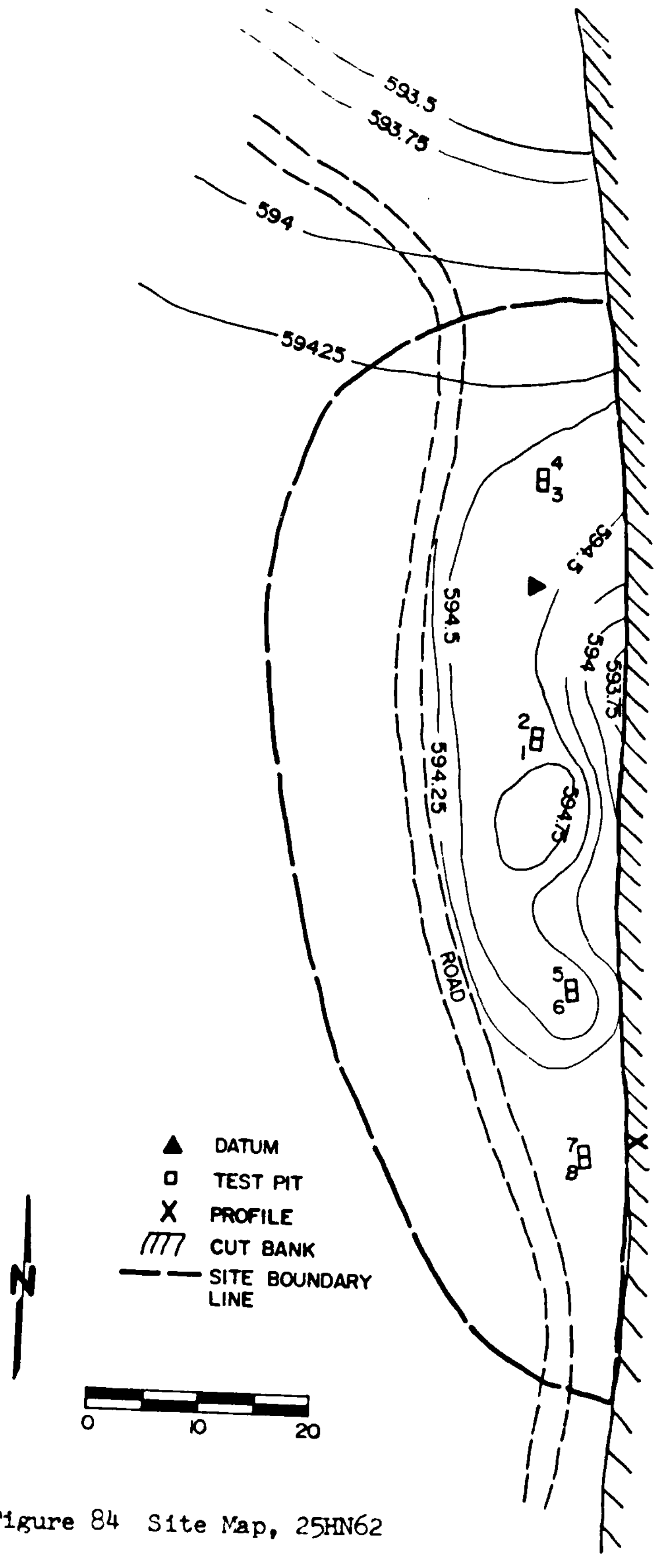


Figure 84 Site Map, 25HN62

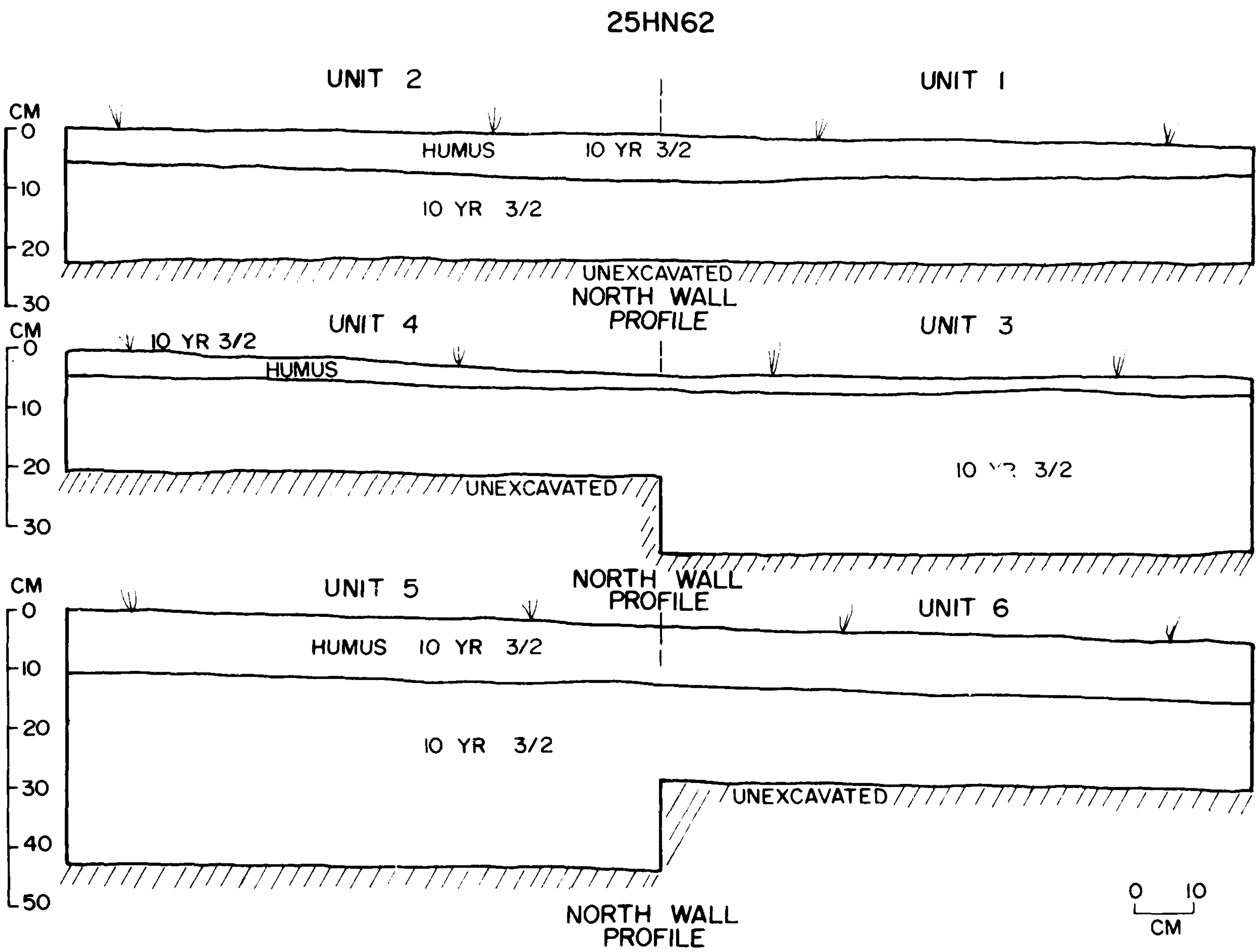


Figure 85. Profile of units 1, 2, 3, 4, 5, and 6 at site 25HN62.

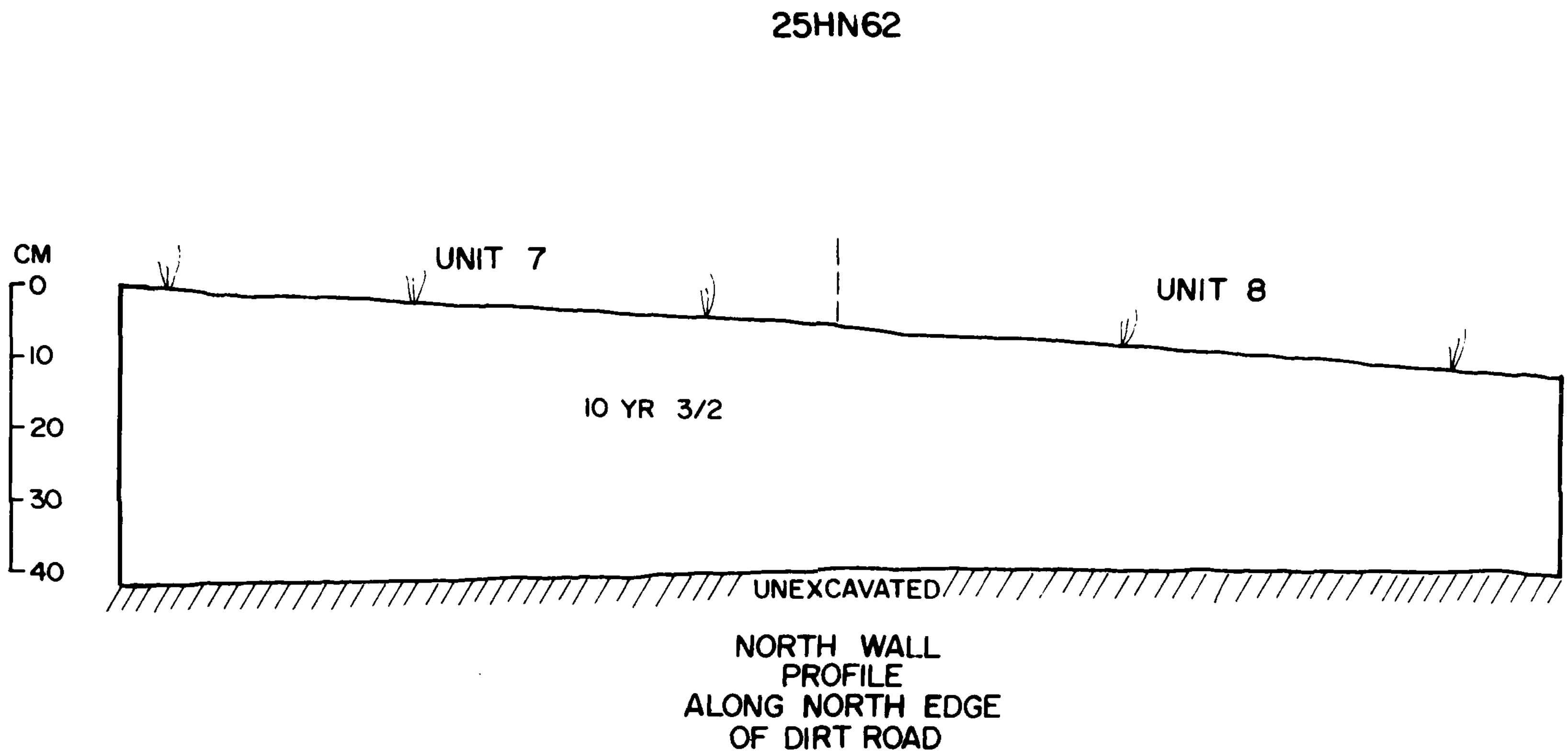
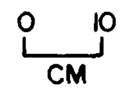


Figure 86. Profile of units 7 and 8 at site 25HN62.



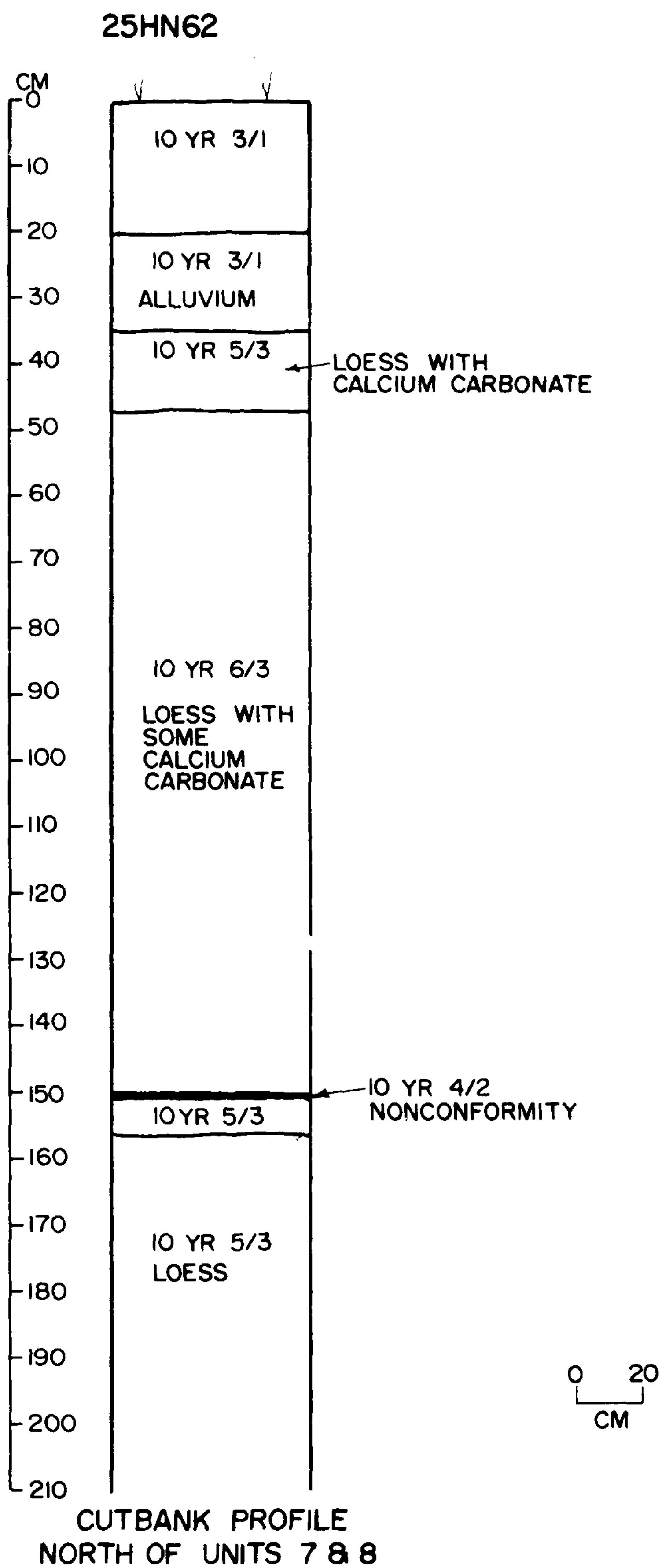


Figure 87. Profile of the cut bank at site 25HN62.

25HN124

Figures	88 through 90
Site Type	Camp
Recorded	1980, Impact Services, Inc.
Size	5,000 square meters
Cultural Affiliation	Unknown
Topographic Setting	Ridge top
Name	Unnamed
Drainage	Methodist Creek
Surface Visibility	10 percent

Previous Research

This site was originally recorded in 1979-1980 by Impact Services, Inc. It is described as primarily a lithic scatter in an upland setting close to the former drainage of Methodist Creek. Several flakes and a broken biface were recovered during initial investigations and the site was estimated to be about 600 square meters in size (Roetzel et al. 1982:44). Three auger tests, however, failed to recover any subsurface deposits.

1985 Investigations

The 1985 investigations focused on defining the nature and extent of the cultural deposits. To this end, test excavation units, auger tests and a backhoe trench were the proposed techniques (Adair and Brown 1985).

Investigations consisted of manual excavation of two 1 X 2 meter units and a backhoe trench (Figs. 88 through 90). Manual excavations were in arbitrary 10 cm levels. Units 1, 2 and 4 were dug to a depth of 30 cm and unit 3 was dug to 40 cm (Fig. 89, Table 55). The few cultural remains recovered from excavations were found in the 10 to 20 cm level. The site does not appear to have been cultivated, but a road traverses the entire length of the site (Fig. 88). Examination of the soils within the backhoe trench, which was dug to a depth of 150 cm (Fig. 90), did not reveal evidence of deeply buried cultural horizons. The soils indicate a relatively stable ground surface. Paul Prettyman (local resident, Alma, personal communication 1985) reported finding numerous triangular arrow points at the site when the road was first graded.

Interpretations

Site 25HN124 is believed to be a seasonal hunting and gathering camp used by Plains Village peoples. The location of the site on a high ridge would have made it disadvantageous for occupation during the winter months. The large quantity of arrow points reported from the site by Paul Prettyman in conjuction with the low frequency of other cultural remains (e.g., flakes, shatter, cores, pottery) suggests its use as a hunting camp.

Recommendations

Site 25HN124 has been severely disturbed by road construction. Test excavations indicate cultural remains are confined to the uppermost 20 cm of loess. Because of the paucity of artifacts recovered and the absence of diagnostic materials in addition to severe disturbance of the site by road construction and rodent burrowing, the authors do not recommend the site for consideration of potenial eligibility for nomination to the National Register of Historic Places.

Table 55

25HN124
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds
0-10 cm					
10-20 cm					
20-30 cm					
Unit 2					
0-10 cm					
10-20 cm	3			1	
20-30 cm					
Unit 3					
0-10 cm					
10-20 cm	1				
20-30 cm					
30-40 cm					
Unit 4					
0-10 cm					
10-20 cm	1				
20-30 cm					
Totals	5				

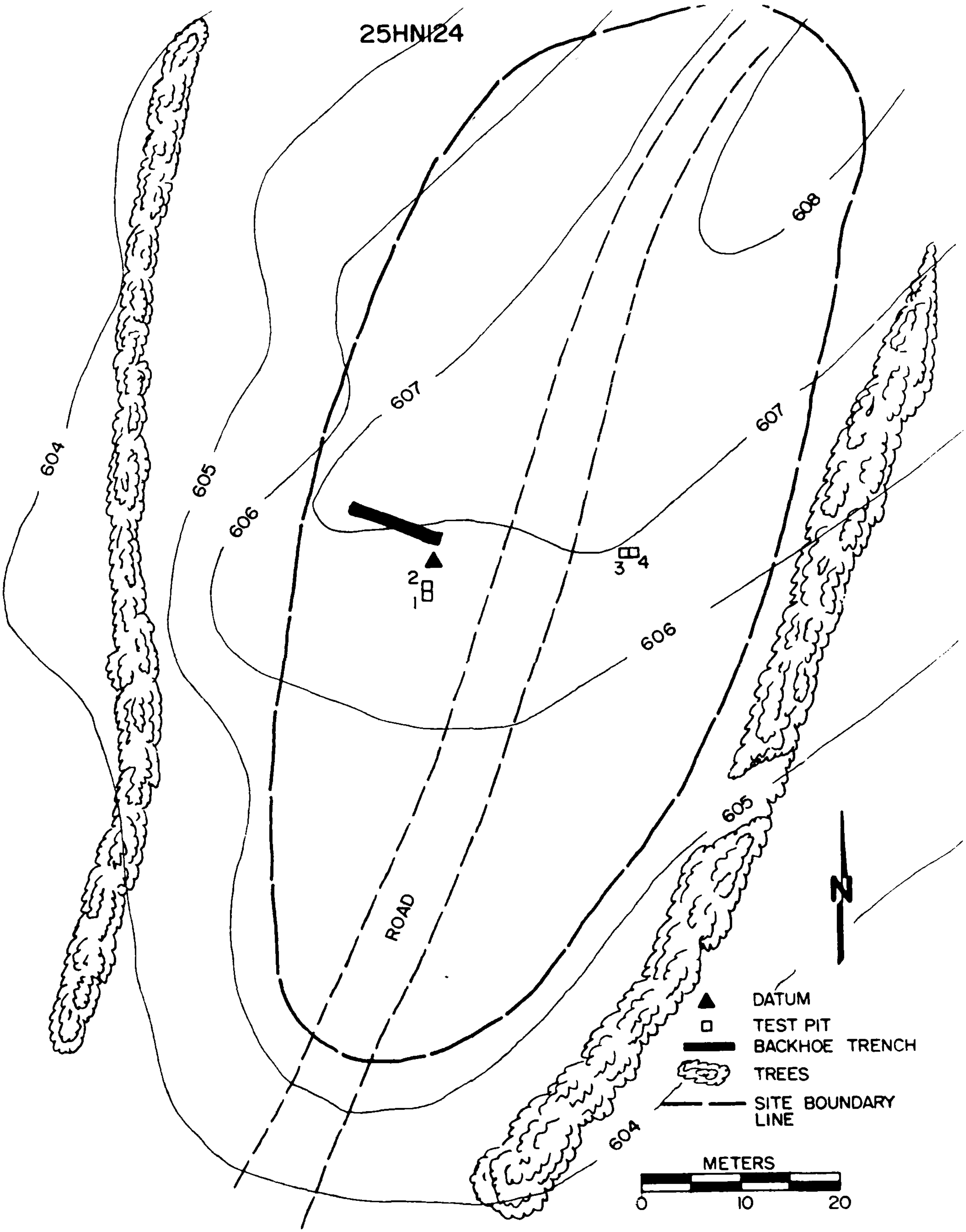


Figure 88. Site map of 25HN124.

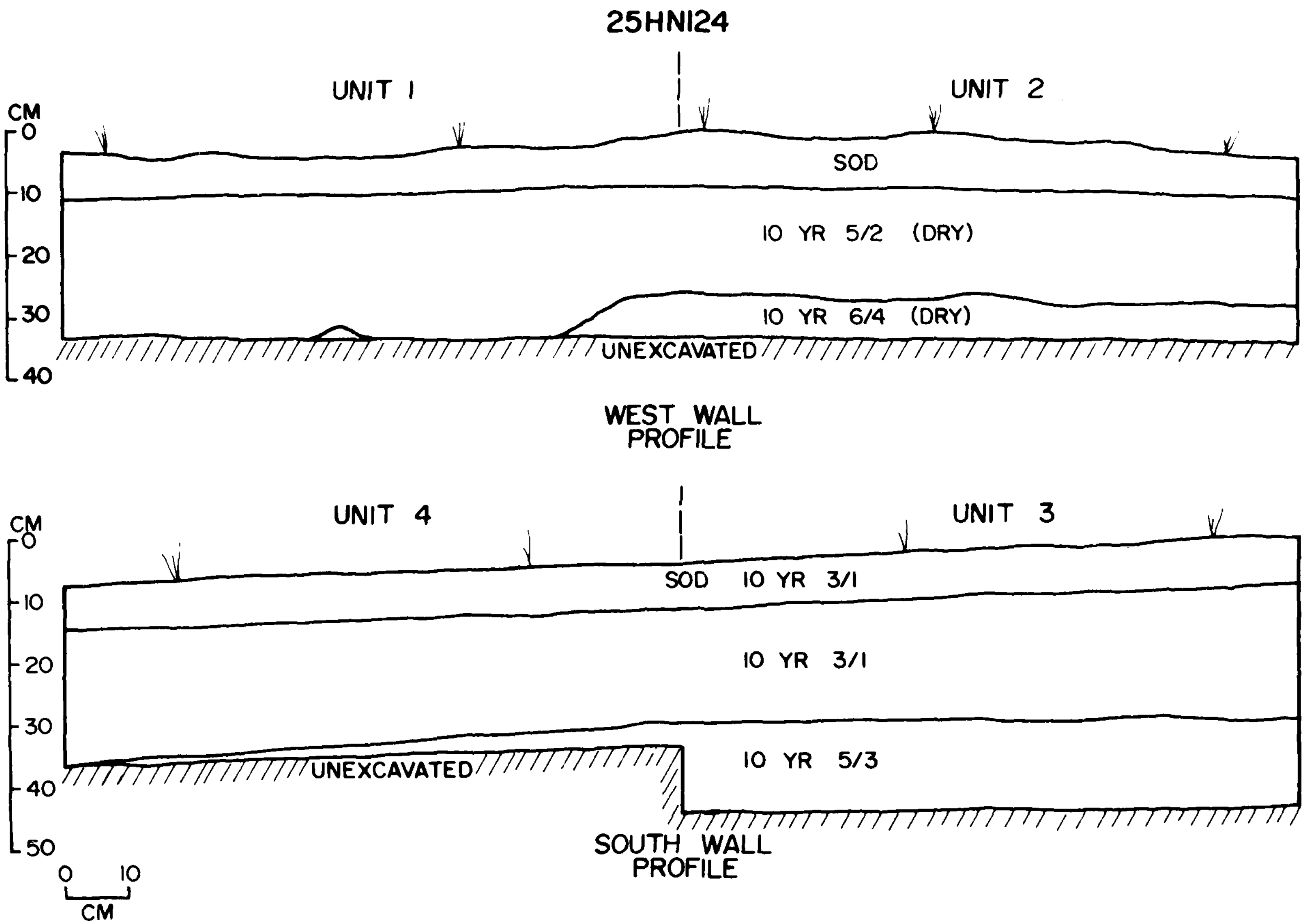


Figure 89. Profile of units 1, 2, 3, and 4 at site 25HN124.

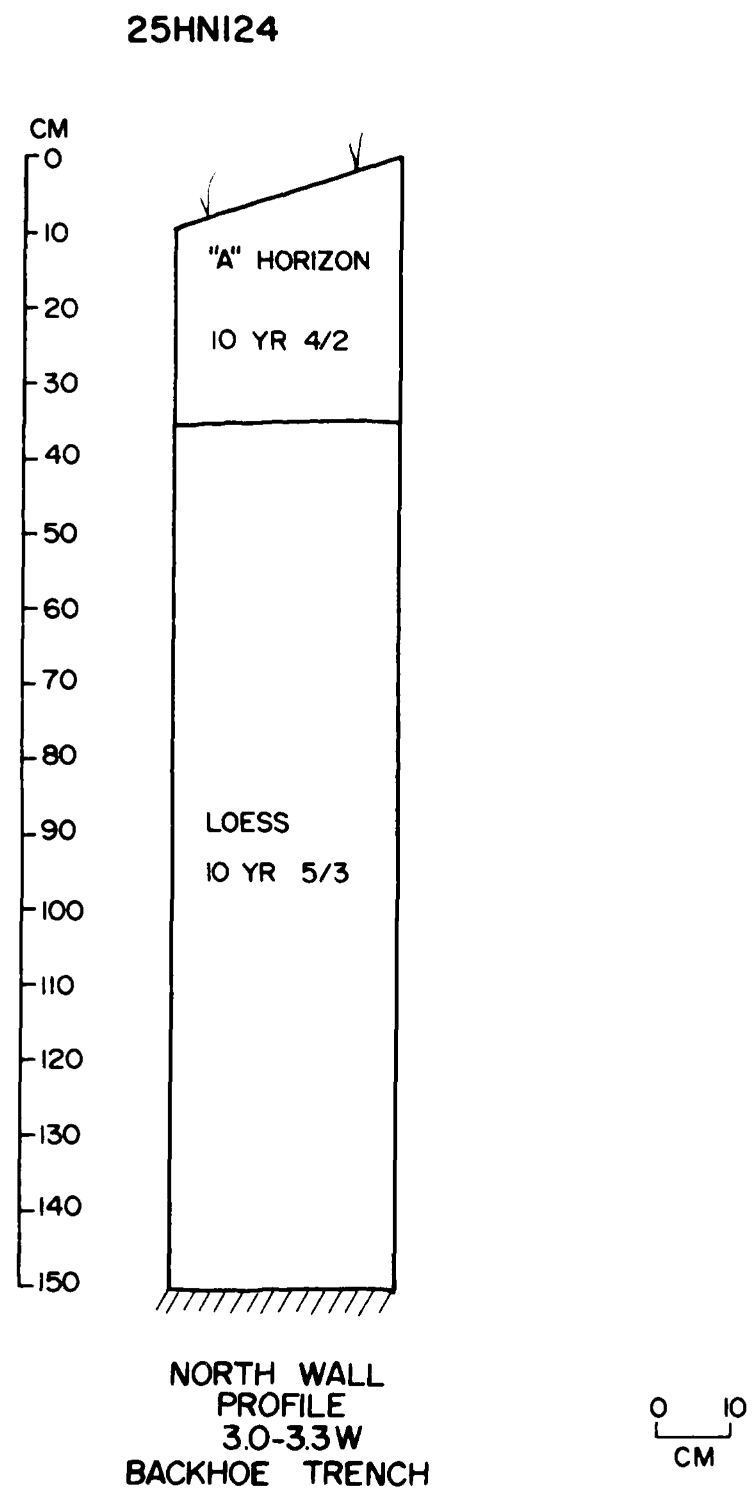


Figure 90. Profile of the backhoe trench at site 25HN124.

25HN125

Figures	91 through 94
Site Type	Habitation
Recorded	1980, Impact Services, Inc.
Size	3,000 square meters
Cultural Affiliation	Keith complex
Topographic Setting	Terrace
Name	Unnamed
Drainage	Methodist Creek
Surface Visibility	25 percent

Previous Research

Also recorded by Impact Services, Inc., this site is located close to 25HN124 and is described as an upland habitation (Roetzel et al. 1982). When the site was recorded in 1979, cultural material was eroding out of a cut bank at a depth of 20-30 cm below the surface. Because the site had no recognizable surface manifestation, its size could not be determined. Cut bank planing and two small shovel tests provided inconclusive evidence regarding site extent and cultural affiliation.

Investigations proposed for 1985 included manual excavation of test units, systematic auger tests and backhoe trenching to determine the nature and extent of the cultural deposits (Adair and Brown 1985:88).

1985 Investigations

Investigations consisted of manual excavation of two 1 X 2 meter units and two backhoe trenches (Figs. 91 through 94). Manual excavations were done in arbitrary 10 cm levels. Unit 1 was dug to a depth of 60 cm, unit 2 was dug to 100 cm, unit 3 was dug to 50 cm and unit 4 was dug to 40 cm (Figs. 92 and 93, Table 56). The backhoe trenches were dug to depths of 150 cm (Fig. 94). Most cultural remains were recovered from 20 to 90 cm in units 1 and 2 and from 10 to 30 cm in units 3 and 4. Examination of both the cut bank on the west and south sides of the site and the backhoe trenches did not reveal the presence of a more deeply buried cultural horizon. The test excavations indicate the major part of the site is on the west side of the land peninusla (e.e., where units 1 and 2 were located). There appeared to be a cultural midden in this portion of the site, with cultural material extending to a depth of 100 cm. However, upon closer examination, the area where units 1 and 2 were located had been subjected to severe rodent burrowing. Placement of the backhoe trenches perpendicular to each other, with one near units 1 and 2, did not reveal evidence of deeply buried cultural remains or a midden.

Artifacts recovered from test excavations included a corner notched projectile point with its tip missing. The point was recovered from unit 1 at a depth of 20-30 cm. A bifacially flaked knife fragment (proximal end is missing) was recovered from unit 4 at a depth of 20-30 cm. A biface resharpening flake was recovered from unit 2 at a depth of 40-50 cm. Charcoal and burned earth recovered from excavations total 0.2 and 1.5 grams, respectively. There was no evidence that the site has been cultivated. The presence of a road over most of the site surface has undoubtedly disturbed the cultural integrity of the site.

Interpretations

Based on recovered ceramics, site 25HN125 represents a semi-permanent or permanent Keith complex occupation. A few faunal (Table 57) and floral (Table 58) remains were found. The botanical remains recovered from units 1 and 2 consist primarily of small fragments of wood charcoal and fresh seeds of several weedy annuals (Table 58). Goosefoot (*Chenopodium perlandieri*) and sunflower (*Helianthus annuus*) are represented by a few seeds. The recovery of a projectile point and a variety of other stone tools indicate several different tasks were performed at the site.

Recommendations

Site 25HN125 represents a permanent or semi-permanent occupation by peoples of the Keith complex. Intensive use of a road that traverses a large portion of the site, extensive rodent burrowing and extensive shoreline erosion have greatly destroyed large portions of the site. Examination of the backhoe trenches and cut banks did not reveal deeply buried cultural deposits. Because of the paucity of cultural materials in addition to severe site disturbance, the authors do not recommend that the site be considered potentially eligible for nomination to the National Register of Historic Places.

Table 56

25HN125
Artifacts

Unit 1	flakes	blades	potlids	shatter	body sherds
0-10 cm					
10-20 cm					
20-30 cm	6				
30-40 cm	8		1		1
40-50 cm	4				1
50-60 cm					
Unit 2					
0-10 cm					
10-20 cm					
20-30 cm	11			1	3
30-40 cm					5
40-50 cm	1				
50-60 cm	3	1			
60-70 cm	2				
70-80 cm					
80-90 cm	2				
90-100 cm				1	
Unit 3					
0-10 cm					
10-20 cm	1				
20-30 cm	1				
30-40 cm	2				
40-50 cm					
Unit 4					
0-10 cm					
10-20 cm					
20-30 cm					
30-40 cm					
Totals	41	1	1	2	10
Surface/ Backhoe Trench	3				

Table 57

Taxonomic Composition of Vertebrate Remains From Site 25HN125 (see Appendix B for Provenience)

Taxon	common names	NISP	MNI
MAMMALIA (NISP=10)	Mammals		
Geomyidae	Pocket Gophers		
Geomys bursarius	Plains Pocket Gopher	7	2
Cervidae	Wapiti, Deer		
Odocoileus sp.	Deer	1	1
Deer-size		1	-
Bison-size		1	-
Indeterminate mammal (N=6)		-	-
TOTAL		10	3

Table 58

Identified Flora From 25HN125

unit	level	taxon	common	amount
1	50-60 cm		charcoal	>1 g
2	20-30 cm	*Helianthus annuus*	sunflower	16*
	30-40 cm	*Chenopodium berlandieri*	goosefoot	1*
			charcoal	>1 g
	70-80 cm		charcoal	>1 g

* fresh seed

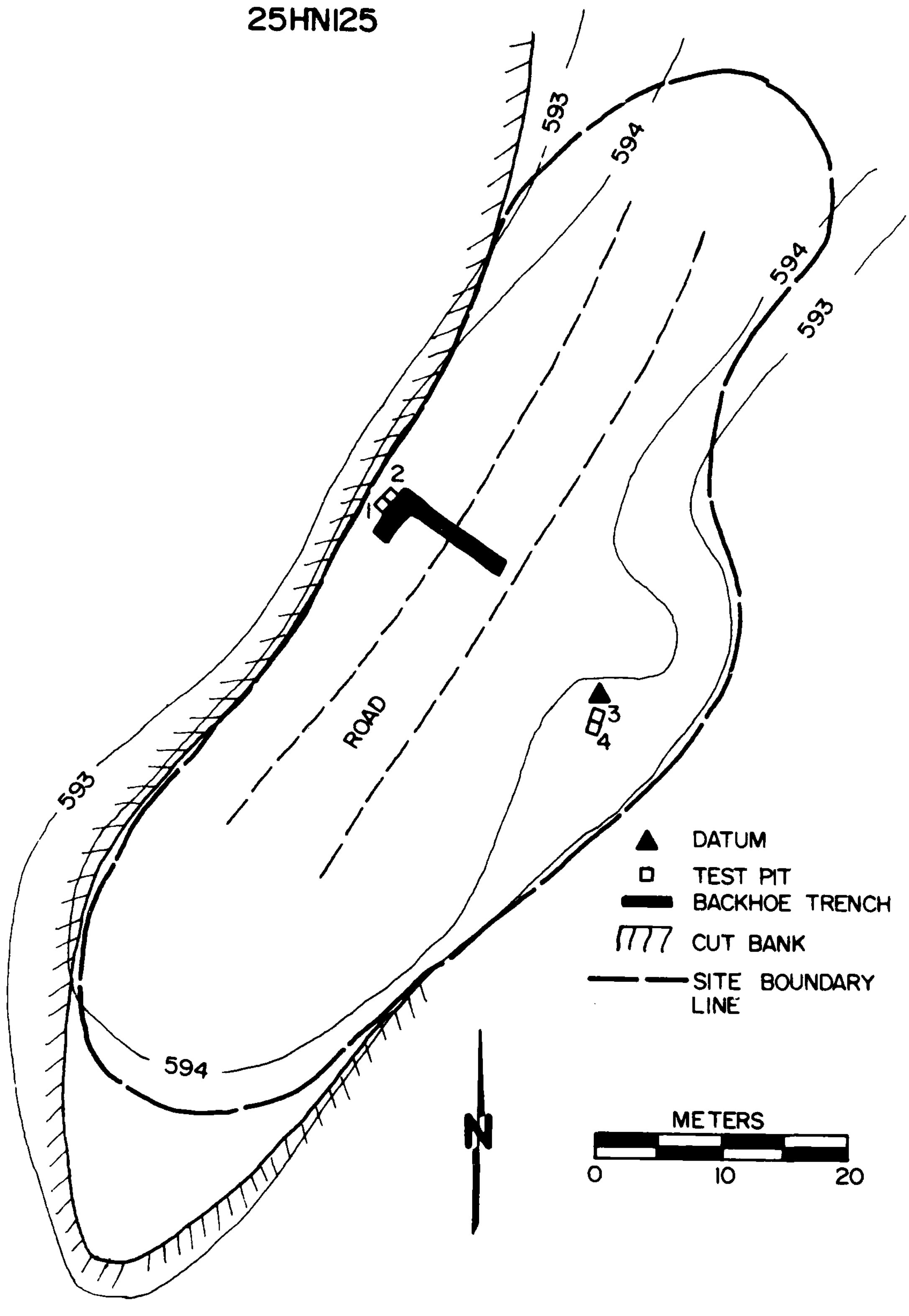


Figure 91. Site map of 25HN125.

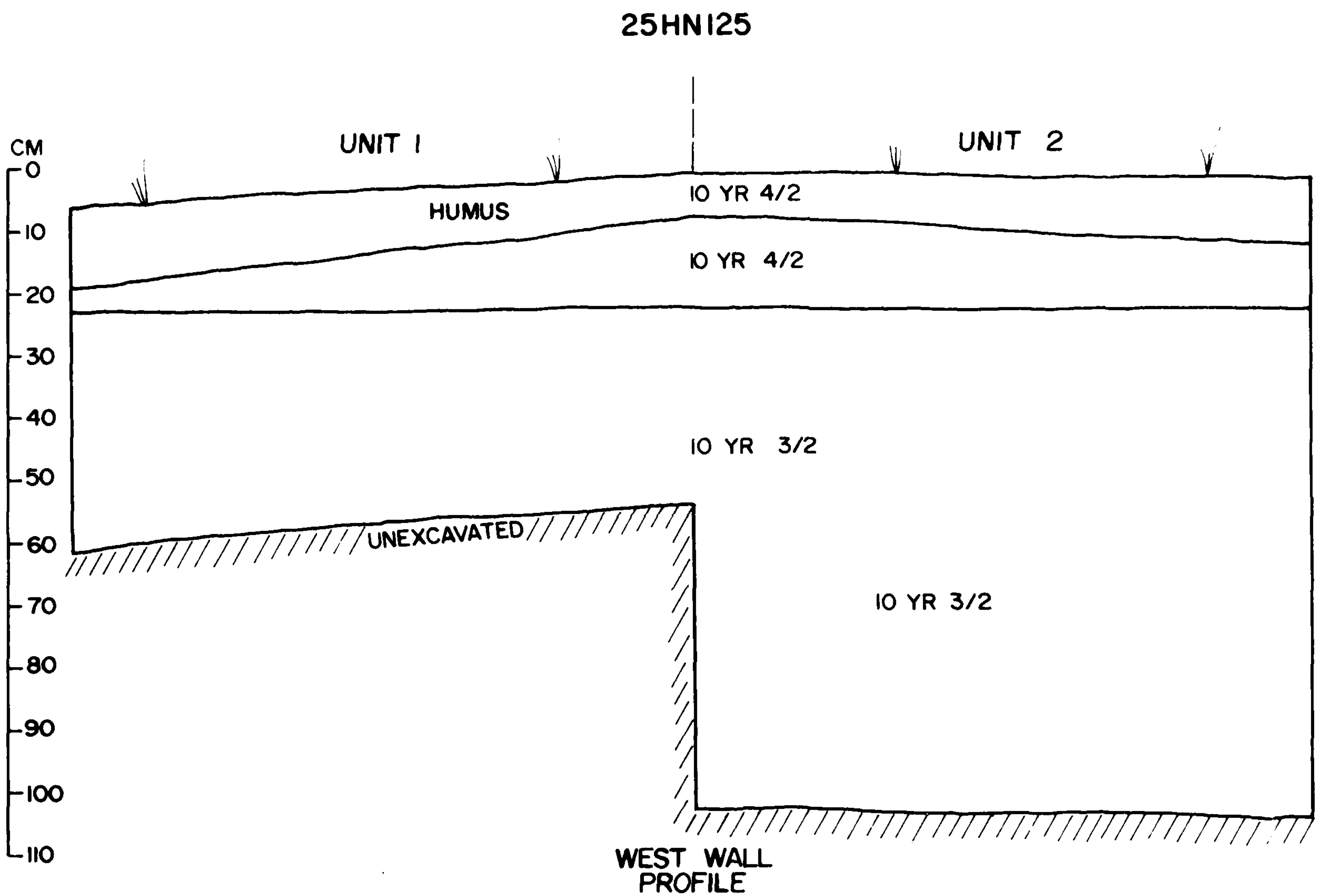


Figure 92. Profile of units 1 and 2 at site 25HN125.

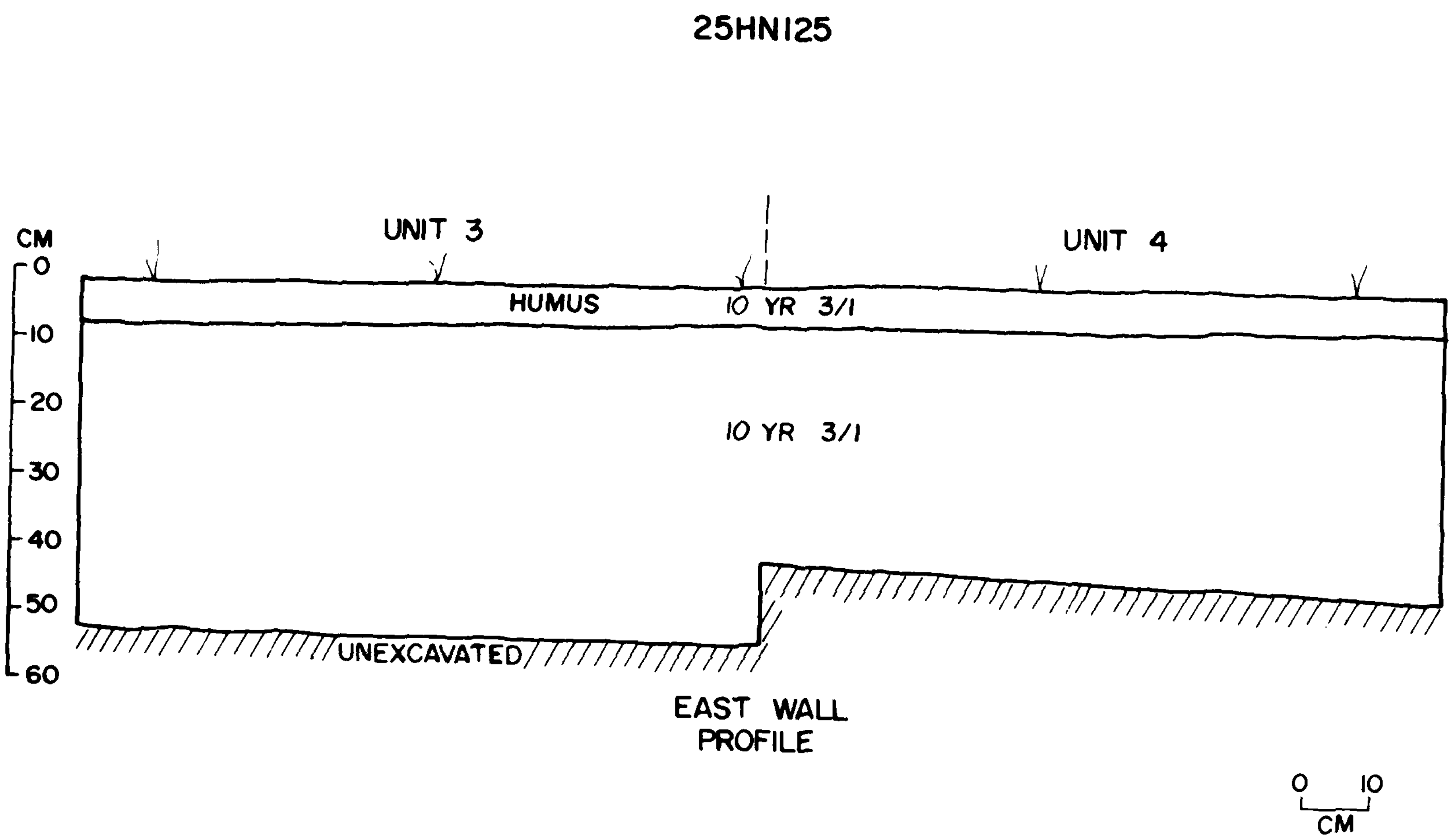


Figure 93. Profile of units 3 and 4 at site 25HN125.

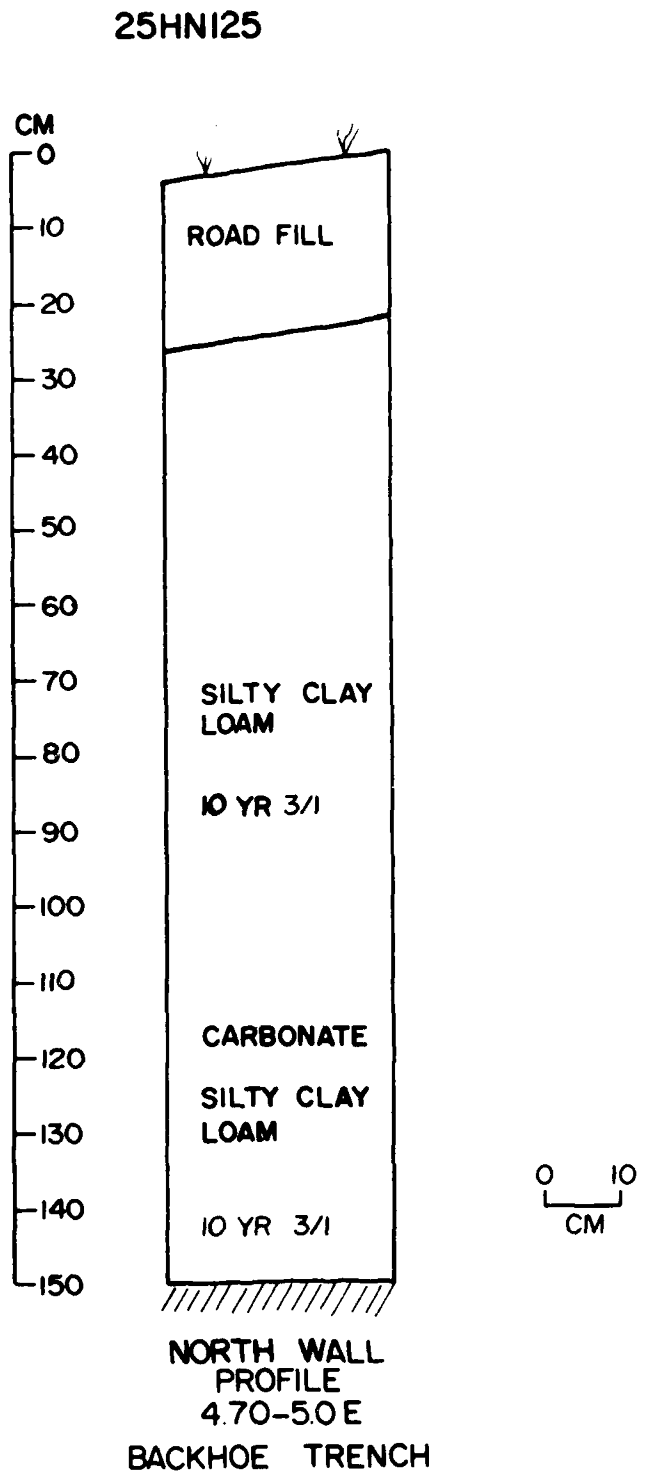


Figure 94. Profile of the backhoe trench at site 25HN125.

25HN164

Figure	95
Plates	9 and 10
Site Type	Camp
Recorded	1980, Impact Services of Mankato, Inc.
Size	7,000 square meters (buried)
Cultural Affiliation	Paleo-Indian
Topographic Setting	Hill slope, cut bank
Name	North Cove
Drainage	Unnamed, between Mill Creek and Tipover Creek
Surface Visibility	10 percent (100 percent on cut bank)

Previous Research

Site 25HN164 was originally recorded by Impact Services of Mankato in 1980 (Roetzel et al. 1982) based on the recovery of several flakes from the beach. The deeply buried potential Paleo-Indian occupation at the site was not recognized until 1985 by several paleontologists and paleobotanists from the University of Kansas. No work had been done with the deeply buried horizons until the current project (see Chapter 7.2). The potential Paleo-Indian occupation is buried seven meters below the ground surface.

1985 Investigations

The North Cove site, located on the west bank of the North Cove inlet, yielded significant archaeological, paleontological and geological data from the Late Wisconsinan time. A massive cut bank has been exposed revealing a panoramic cross section of the local stratigraphy. A very prominent paleosol horizon bisects the eastern portion of the cut bank (Plate 9). Radiocarbon dates obtained from macrofossils of spruce wood and bone of recovered fauna range from 12,700 to 8,170 B.C. The occurrence of an extinct bison (*Bison occidentalis*) skull within the deposit also indicates Late Wisconsinan time.

The archaeological significance of the site is in the recovery of a small retouched flake recovered from soils also yielding Late Wisconsinan fauna (Table 60, Plate 10) from Unit C (see Chapter 7.2). It was recovered from unit C (see Chapter 7.2) stratigraphic profile number 2 at a depth of approximately 7 meters below present ground surface. This stratigraphic unit was exposed on the outer surface of the vertical cliff. However, to reveal a more defined unit, the vertical cliff was cut back approximately 1 meter before sediment samples were retrieved. Not only was a clearer demarkation of the unit visible, but the clean surface offered a better opportunity to identify intrusive elements.

Sediments taken from this stratigraphic unit, as well as all other units, were extracted in 5-15 cm levels, according to the natural stratigraphy. The retouched flake was identified in a geologic screen while sediments from unit C were being screened. The archaeologist, geomorphologist and palentologist all concur however, that there is very little chance of this artifact being intrusive. No obvious breaks in the stratigraphic profile were visible and extreme care was taken to keep the vertical surface clearly exposed. The fact that the flake was found in sediments also yielding Late Wisconsinan flora and fauna suggests that temporally the artifact is associated with the Paleo-Indian period. Radiocarbon dates from the North Cove site are in agreement with this. It is recognized that a diagnostic Paleo-Indian artifact, perhaps embedded in a faunal element of Late Wisconsinan age, offers far more substantial evidence for prehistoric occupation during this time period. However, the likelihood of recovering such a find, particularly during a limited testing program, is limited to chance. Any artifact found in good context with radiocarbon dated Late Wisconsinan materials should provide undisputable evidence of human occupation. Unfortunately, this modified flake was found in a screen rather than in situ, making human occupation at the site a potential rather than an absolute factor.

Another problem is that the flake is the only cultural artifact recovered from the deeply buried horizons. Also, the context of the flake suggests it was probably water deposited, i.e., it had been eroded and transported from its original cultural context. The nature of the buried paleosol would indicate the original cultural context of the flake may be to the west, or into the cut bank. This assessment is based on results of the coring of the embankment west of the cut bank. Results of the coring indicate the paleosol slopes toward the surface as one proceeds from east to west (or from the cut bank to the west). Consequently, if the flake recovered from the cutbank was not in situ as left by its manufacturers, it most likely originated west, or uphill from the cutbank. In this scenario, the flake originated at a higher location and was transported downhill.

The occurrence of Late Pleistocene megafauna eroding from the deeply buried deposits in association with the retouched flake would support the presence of a buried Paleo-Indian occupation nearby. The most likely place for the occupation is to the west, or into the cut bank. Radiocarbon dated spruce wood from below the flake have yielded dates of 12,750 B.C. (Beta-12286), 11,150 B.C. (UGa-5477), and 11,015 B.C. (UGa-5476). Wood recovered from above the flake has yielded a date of 10,730.250 B.C. (Beta-18188), placing the age of the flake deposition between 11,015 to 10,730 B.C.

An archaeology team consisting of two persons spent several days cutting back columns within the extensive cut bank. Four soil profiles were drawn of these sections (see Chapter 7.2). The geomorphology of the site is discussed below and the paleontology and botanical data is discussed in Chapter 7.2.

Geomorphology

Limited geomorphic field work at the site has suggested that the paleosol bisecting the deposit and the alluvial nature of the overlying sediment are consistent with the T2 terrace sequence that occurs throughout the project area (see Chapter 4). Radiocarbon ages, obtained from spruce wood located within the paleosol, are consistent with the age and stratigraphic location of the Brady Paleosol (Soil YY of Libby 1955). The presence of horizontally stratified silts and clay, and occasional sand lenses and pockets, are consistent with the observed nature of the T2 terrace in other project locations. The terrace deposit overlies a relatively thin (five foot thick) layer of cross-bedded sands and gravel that overlie the Cretaceous Age Pierre Shale.

The occurrence of the Brady Paleosol near the base of the deposit suggests correlation with the T2a terrace (of Schultz et al. 1951). Conversely, the Brady paleosol generally occurs near the top of the T2b terrace. Despite the occasionally steeply sloping surface of the deposit, the relative elevation of the deposit is consistent with elevations of the T2 terrace at nearby localities (e.g., site 25HN53 located east of the North Cove site). The deposit itself does not extend very far back into the nearby upland hills as soil borings reveal the deposit pinches out approximately 33 meters north of the exposed cut bank. It is most likely that recent shore erosion has removed the more visible characteristics of the terrace such as a flat to gently sloping surface.

The terrace deposit stratigraphically overlays a brown, silty clay, loessal material to the west. Several mollusk shells collected in this loessal material by J.D. Stewart as belonging to one of five groups; *Vallonia gracilicosta*; *Hawaiia minuscula*; *Discus cronkhitei*; *Cionella lubrica*; and succineids. Previous paleontological work (Leonard 1952) yielded no *Discus*, *Cionella* or *Vallonia gracilicosta* from Bignell Age loess of western Kansas. This suggests a pre-Bignell loess (Peoria?) for this material. The absence of the Bignell loess from this locality indicates terrace development was occurring either contemporaneous with, or prior to, deposition of the Bignell loess.

The stratigraphic change from fine grained alluvium/colluvium material to cross-bedded and stratified sands and gravel beneath the terrace deposit as the paleosol dips to the east is consistent with terrace development. The occurrence of the paleosol (Brady paleosol) at the base of the terrace deposit indicates a time of relative stability conducive to soil formation. This is consistent with other Late Wisconsinan time scenarios (Brice 1966; Reed et al. 1965; Schultz et al. 1970).

At least one spring was observed at the base of this terrace deposit. William Johnson (Professor of Geography, University of Kansas, personal communication 1986) has suggested that the occurrence of sands and gravel beneath the terrace alluvium/colluvium provides good feeder conduits for water that is migrating upward from saturated basal sands. It is possible that this phenomena is responsible for several of the observed stratigraphic features.

Recommendations

Because of the presence of in situ, Late Pleistocene deposits containing Late Wisconsinan fauna and flora, in addition to evidence for the presence of Paleo-Indians, the authors consider the North Cove site, 25HN164, as being the single most scientifically significant site investigated during the present project. The potential archaeological as well as the known faunal and botanical data indicates the site contains information that would substantially increase knowledge of the region for the Late Pleistocene period. The occurrence of the site at the base of a seven meter soil cut bank that is being severely eroded by wave action, is endangering the significance and integrity of the site. Soil cores placed perpendicular to the cut bank indicate the buried paleosol pinches out as one goes west into the cut bank. The site, therefore, will soon be completely destroyed by shoreline erosion. Consideration should be given to its preservation (see Chapter 11). The authors recommend that the North Cove site, 25HN164, be considered potentially eligible for nomination to the National Register of Historic Places.

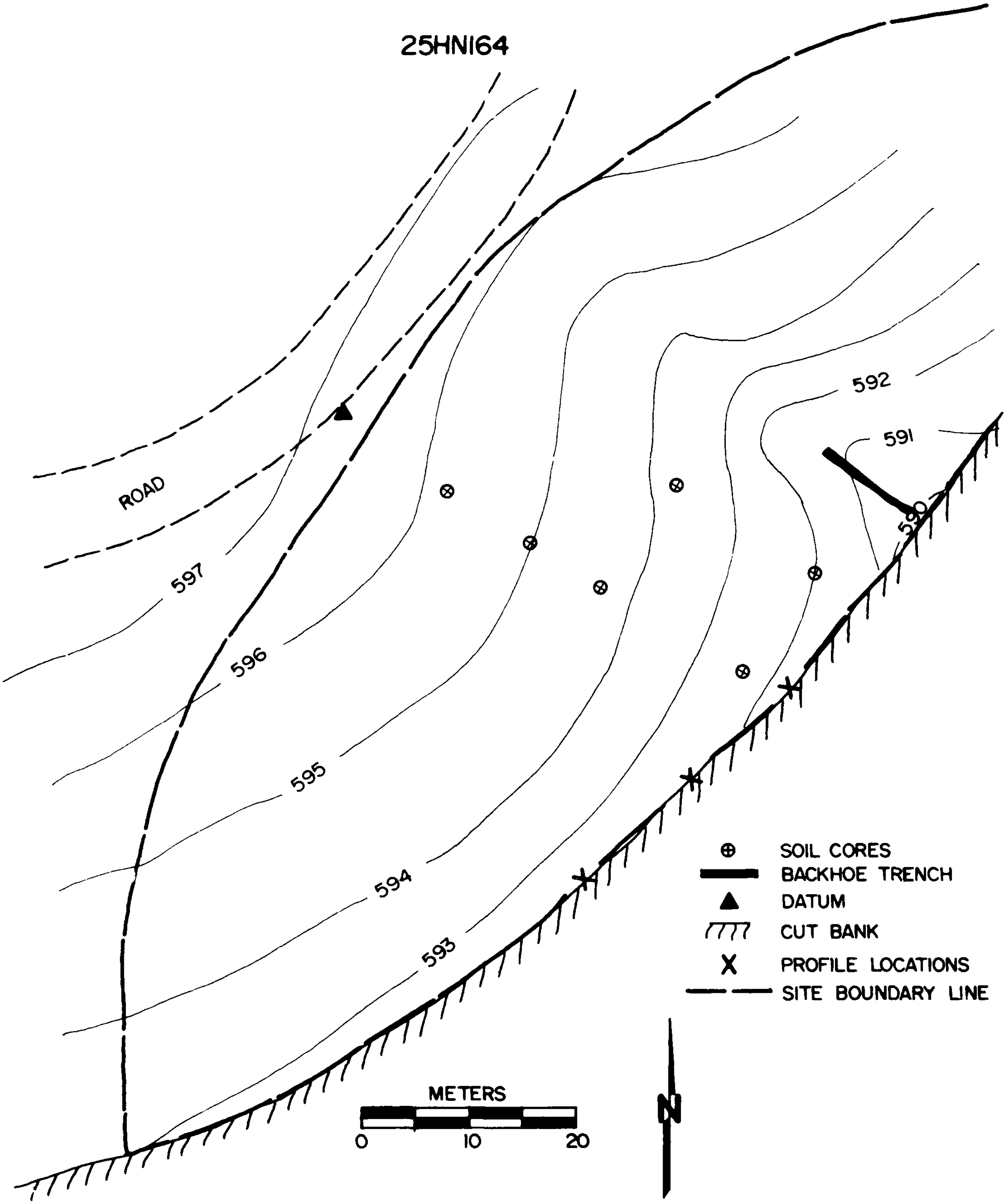


Figure 93. Site map of North Cove, 25HN164.

Plate 9. North Cove (25HN164). Top, view of site from across the cove, showing the exposed cut bank, and (bottom), close-up view of the stratigraphy.

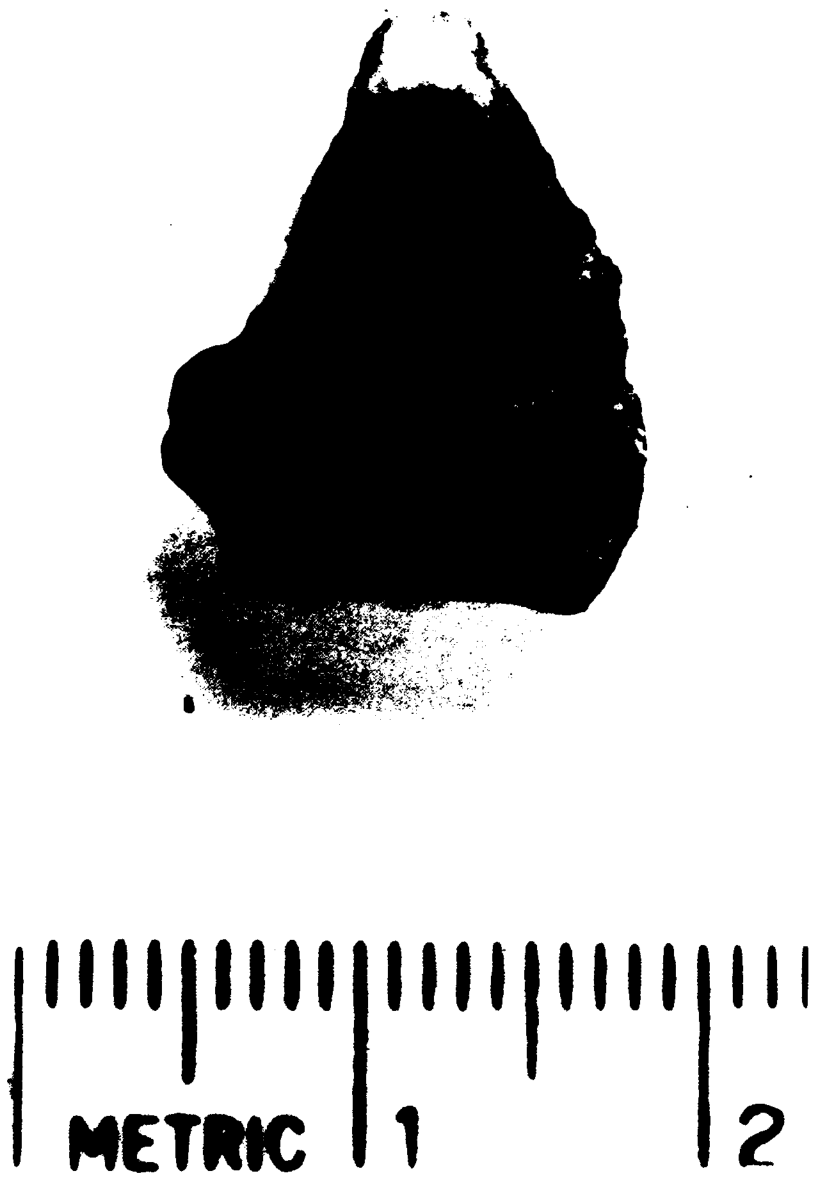


Plate 10. Retouched flake from the North Cove site, 25HN164.

Buffalo Bill's Cave

Figure	96
Plate	11
Site Type	Rockshelter
Recorded	Unknown
Size	1,000 square meters, general area
Cultural Affiliation	None
Topographic Setting	Hill slope
Name	Buffalo Bill's Cave
Drainage	Prairie Dog Creek
Surface Visibility	10 percent

Previous Research

A small rockshelter ledge occurs in a draw south of the present day lake. The occurrence of several large pieces of ledge at the bottom of the small draw suggests that undercutting and subsequent erosion have destroyed portions of the roof. The rock ledge cavity is relatively small, approximately 8 feet high, 12 feet deep, and is exposed in a small draw that drains to the west-northwest. The ledge is composed of cross-bedded sand, silt and gravel that has been cemented together forming a resistant bed. This resistant bed is most likely representative of the Ogallala Formation (Pliocene in age) in this area. This was the only occurrence of the Ogallala Formation to have been encountered in the Harlan County Lake project area.

Wet seams along the back wall and floor suggest the presence of a spring or permeating surface drainage beneath the ledge. The location of the rockshelter, near the bottom of the small draw, would present problems for potential occupants as rain would bring runoff directly over the ledge and percolating ground water would permeate the shelter walls and floor. It is also possible that if the rockshelter were truly a cave in the past, perhaps it was of such dimensions that seeping water was a convenience and not a problem.

According to Kivett (1947:11) the rockshelter has been nearly destroyed by erosion. Although known locally as "Buffalo Bill's Cave", Kivett believes it to have no authenticated relationship to the lengendary Buffalo Bill Cody.

1985 Investigations

An archaeology team of two persons carefully traversed the rockshelter and its immediate environs with a White's Metal Detector. The only evidence of ferous metal was that of a recent hearth that had become grown over with grass

(Fig. 96). Excavation of the hearth revealed charcoal and several metal cans. No other evidence of human occupation of the rockshelter was delineated. There was no evidence, based on the archeology, that the rockshelter had been used for habitation during the 19th Century.

History

The local legends and stories regarding this unique geological formation have, unfortunately, clouded historical reality for nearly a hundred years. This is certainly understandable when reviewing the background of this historical figure whose name has been linked to the rock shelter since the days of his personal glorification by Ned Buntline and other "Wild West" dime novel writers. The life of William F. "Buffalo Bill" Cody, the legendary frontiersman, buffalo hunter, and Wild West Show entrepreneur, is the story of a man whose daring deeds have been exaggerated and overblown by writers in both the nineteenth century and in recent times. In the recounting of some of these events, it is difficult to disseminate the truth from the fiction. This has been the problem with Buffalo Bill's Cave which is located in Republican City Township near the mouth of Prairie Dog Creek.

The most popular legend about William F. Cody and the cave is the one concerning his hunting and trapping exploits with his friend Dave Harrington near the mouth of Prairie Dog Creek in the winter of 1859. Cody slipped and broke his leg while he was pursuing a herd of elk near their campsite. Harrington rode nearly 125 miles to enlist help while Cody lay encamped in this rock shelter, nursing his leg and awaiting his comrade's return (Cody 1888:449-56).

Although the incident mentioned did take place, there is sufficient evidence to indicate that Cody nursed his broken leg in a dugout somewhere in the vicinity and not in the rock shelter now known as Buffalo Bill's Cave. A closer investigation of the story revealed the following details.

In November 1859, while in the company of Dave Harrington, Cody traveled up the Republican River on a trapping expedition. Their outfit consisted of one wagon and a yoke of oxen for the transportation of provisions, traps, "and other necessities" (Visscher and Cody 1917:63). After trying their luck in the Junction City, Kansas, vicinity, they continued their trek up the Republican River until they came to the mouth of Prairie Dog Creek, where the beavers were plentiful. Once they had decided to stay at the site until spring, they constructed a dugout so they could survive the winter in relative comfort. The dugout consisted of a "cosy hole in the ground, covered with poles, grass and sod, with a fireplace in one end" (Visscher and Cody 1917:64).

Unfortunately, Cody and Harrington had more than their share of problems. Soon after the camp was established, one of the oxen slipped and fell on the ice, dislocating a hip. They were forced to shoot the animal in order to put an end to its misery. This left them without a team and unable to use their wagon (Cody 1888:449-50). Then the situation was further complicated by Cody's accident. He was "spying a herd of elk" and went in pursuit, slipping up on them around the bend of a sharp bluff or on the bank of a creek, at which time he fell and broke his leg above the ankle (Cody 1917:63-64).

Dave Harrington successfully got the young Bill Cody back to camp, which was only a few yards from the creek, and then he set the fracture as carefully as possible. Since their plans to trap the entire winter were suddenly changed, it was decided that Harrington would go to the nearest settlement 125 miles away for a yoke of oxen and then return for Cody. The wagon was essentially useless without a full yoke of oxen, and therefore, Cody could not make the long trip without immense suffering or permanent injury (Cody 1888:450-51).

Before leaving Cody alone in the dugout, Harrington gathered plenty of wood, water and provisions. He knew that it would take at least 20 days to make the trip. Since there was plenty of meat and water on hand, he left immediately. Cody lay in camp "helpless and alone," making "a note of each day so as to know the time when [he] might expect [Harrington] back" (Cody 1917:64).

Harrington's absence did not pass without incident. On the 12th day after Harrington's departure, Cody was visited by a party of roving Dakota (Sioux) who entered the dugout and spoke in a mixture of broken English and Dakota. Cody noted in his autobiography that he felt his "time had come" as the party was "on the warpath" and daubed with war paint (Visscher and Cody 1917:65). Then into the dugout stepped an old Dakota chief known as Rain-in-the-Face who was an acquaintance of Cody's during the time he spent around Fort Laramie, Wyoming.

The chief proved to be Cody's salvation as he coerced his warriors to spare Cody's life. However, he allowed his warriors to help themselves to his provisions, supplies, cooking utensils and firearms. They left the young Cody some meat, a small quantity of flour, a little salt and some baking powder (Visscher and Cody 1917:65-66). After removing everything else that they could carry, the party of Dakota rode south, "evidently bent on murdering and thieving" (Cody 1888:452). Cody noted that, "had it not been for my youth and the timely recognition and interference of old Rain-in-the-Face they would have killed me without any hesitation or ceremony" (Visscher and Cody 1917:66-67).

This was not the end of Cody's troubles. A snow storm set in for three days, blocking the doorway of the dugout with several feet of snow. Not only did it bury his precious wood supply, but it also delayed Harrington's return. The twentieth day came and went without a sign of Harrington. The wolves would howl and scratch at the roof of the dugout as if trying to get in. Some days Cody went without a fire at all. He often had to eat raw frozen meat and drink melted snow for water (Visscher and Cody 1917:66-67).

Finally, on the twenty-ninth day, Harrington returned with the oxen and supplies. In a few days all the traps were gathered together and the snow was cleared out of the wagon. A bed was assembled by using a sheet that had been part of the dugout. The men then headed back to Leavenworth via Junction City where they sold a number of beaver skins while en route (Visscher and Cody 1917:67-70). Once he was back in Leavenworth, Cody took several months to recuperate and nurse his leg back to normal. Harrington contracted a serious illness in late April of 1860 and died about a week later. With his passing went half of the possible authentication of the story (Visscher and Cody 1917:70).

This account is the most popular story of Cody's experiences while trapping near the mouth of Prairie Dog Creek in 1859. It has been repeated almost verbatim in books and articles during and after the date of the publishing of his autobiography. Although certain facets of Cody's life are open to speculation and contradictory reports, this one is, in this author's opinion, an authentic and truthful account - except perhaps for the Indian encounter. The incident concerning Chief Rain-in-the-Face is questionable since a thirteen year-old boy would have difficulty knowing a Dakota chief because of the age barriers implanted in Dakotan society. Rain-in-the-Face may have spared Cody's life because of the boy's desperate condition, but it is doubtful that their relationship at Fort Laramie had any significance.

Cody was obliged to relate the story at least two times (Visscher and Cody 1917 and Cody 1908), both of which varied little in the details of his experiences at the mouth of Prairie Dog Creek. This was also a rather "neutral" incident, one in which Cody would have gained little if any fame through false glorification. It is, in fact, one of the more interesting "human" accounts that occurs in his autobiography during his early teenage years. The reader can catch a glimpse of the young Cody alone and injured on the prairie, completely dependent on another human being, Dave Harrington, for his life. There are no fast rides or feats of skill, just one man against the elements. These particular kinds of accounts are usually quite reliable, and despite Cody's reputation for over-exaggeration, this was probably an incident that happened pretty much as he tells it.

Other biographies of Cody also describe his habitation near the mouth of Prairie Dog Creek. The description of the "dugout" noted previously, is from his autobiography as it appeared in both the 1888 and 1917 editions. It indicated that the rock alcove known today as Buffalo Bill's Cave was not the shelter, as Cody described building a dugout, not finding a rockshelter.

In Clarence Ray's Buffalo Bill, The Scout, the habitation on Prairie Dog Creek was also described as a "dugout, a hole made in the gound, covered with poles, upon which were placed grass, leaves and other similar materials" (Ray n.d.: 25). Another account, that reinforces this conclusion, is Elizabeth Leonard and Julia Cody Goodman's Buffalo Bill: King of the Wild West. They noted that Cody and Harrington "built a cozy dugout for themselves out of poles and sod, constructed a fireplace in the wall, which served as oven or furnace, and made a corral outside for the oxen" (Leonard and Goodman 1955:107). Julia Goodman was Cody's older sister, which made this source especially interesting because Julia and Dave Harrington were close friends before his untimely death in 1860. The description of the dugout may have been from either Cody's or Harrington's recollections or both, and it comes closest to being a source giving Harrington's point of view. If so, this would reinforce the dugout theory.

Frank Lee Beal's Buffalo Bill gives a better description of the dugout. "The dugout was built in the side of a hill. It had two small windows and a door. Its roof was made of brush and long grass with a covering of earth. There was a small fireplace in one wall of the dugout to be used for both heating and cooking" (Beal 1943:83). This source definitely discounts the legend that Cody used the rock-shelter. Beal mentioned that the roof was made of earth and that it had a door. This would not be possible if the rock-shelter was utilized.

Perhaps the best source of all is Cody's own True Tales of the Plains. In this recollection, published in 1908, he offered more details on the dugout than any of his previous or later accounts. "We [Harrington and Cody] chose a hollow in a side hill, and enlarged it to the dimensions of a decent-sized room. A chimney was fashioned of stones, the open lower part doing double duty as a cook stove and heater; the bed was spread in the rear, and the wagon cover sheltered the entrance. A corral of poles was built for the oxen, and one corner of it protected by boughs. Altogether we accounted our winter quarters satisfactory and agreeable" (Cody 1908:8).

This description does not correspond to Buffalo Bill's Cave. There was not evidence of a chimney, no possible way to arrange the interior as it was described, and no possible way to keep a corral of oxen nearby because of the rugged terrain unless it was built on a small level area above the rock shelter, which would have made the animals susceptible to roving bands of Indians and to predatory animals.

Only two sources were located that directly linked Buffalo Bill's Cave as Cody's habitation. One was George Thomson's thesis, "History of Republican City, 1871-1950." Thomson claimed that Cody did spend that fateful winter in the cave, but his source of information was a personal interview with a local resident, Jay Drew, who was just passing the legend on as he had heard it when he lived at Republican City. It can be contested by the mere fact that, although Drew was an early settler in the area, he was not contemporaneous with the incident as there would have been few settlers in the area for at least eight years afterward. Therefore he must have heard the incident either second or thirdhand (Thomson 1950:5).

The other source was a recent article entitled "Ordeal on Praire Dog Creek", by Ken Bouc that was published in Nebraskaland Magazine in 1979. In this article, Bouc recounts the same story from Cody's autobiography almost verbatim. He cites the same sources as this author has for his information, but he draws his conclusions from the very first line of the article that states Buffalo Bill's cave was the shelter used by Cody that winter. Obviously, none of his sources defend that assumption, and his conclusions bare no logic with the information that he gleaned from his bibliography. Therefore, this source can be questioned as well as the one mentioned previously (Bouc 1979:16-17, 48).

The physical characteristics of the area also need to be considered when reviewing the evidence. The terrain has probably changed little in the immediate vicinity of Buffalo Bill's Cave in the last 130 years. Choosing Buffalo Bill's Cave as the habitation for Harrington and Cody that winter would have gone against the "codes of survival" that frontiersman followed when dealing with the sometimes violent climate on the Great Plains. The cave's entrance faces directly to the northwest. During the winter months, this would have exposed the trappers to sharp northwesterly winds and to blowing and drifting snow during storms. The immediate terrain is rugged and not naturally conducive for an extended camp situation. The banks nearby are so steep that it would be difficult to maneuver even in the summer, let alone in the winter with several feet of snow on the ground. Finally, as mentioned earlier, there would not have been any place to build a corral for their oxen. In short, the rock shelter known as Buffalo Bill's Cave offered no advantages as a camp site and would have been an impractical isolated spot for Cody and Harrington to have spent a prolonged winter.

Today there is no evidence of reddish fire marks on the shelter's interior, no evidence of a chimney of any sort, and no depressions where poles may have been placed. The archaeological investigations were also unable to locate any surface finds, but that particular part of the rockshelter has collapsed so that some of the ground is covered by immovable boulders that would have made it difficult for them to detect any remains. Nothing was found to indicate a mid-nineteenth century occupation of the site.

Interpretations

In conclusion, most of the evidence and historical information available today on Cody's short-lived camp near the mouth of Prairie Dog Creek would indicate that Harrington and Cody built a dugout, probably on the south bank of Prairie Dog Creek, and not at the rock shelter known as Buffalo Bill's Cave. Despite the local stories and legends surrounding this unique geological formation, there are no sources available to defend its namesake. Although it is in the same general area where the dugout and the camp were located, the cave did not play a role in Cody's narrative. As to where the exact location of the dugout would be today is anyone's conjecture. Since 1859 many floods and droughts have caused the natural forces of erosion to take place, and actually only a few inundations would have been necessary to eliminate most of the evidence of such a habitation. The archaeological investigations found no remains of a dugout or camp of mid-nineteenth century origin in the immediate area, and so the location of that abandoned habitation remains a mystery.

Recommendations

There is no archaeological or historical evidence for the use of this rockshelter by Buffalo Bill, or by anyone, in the 19th Century. The authors, therefore, do not recommend the site for consideration for potential eligibility for nomination to the National Register of Historic Places.

BUFFALO BILL'S CAVE

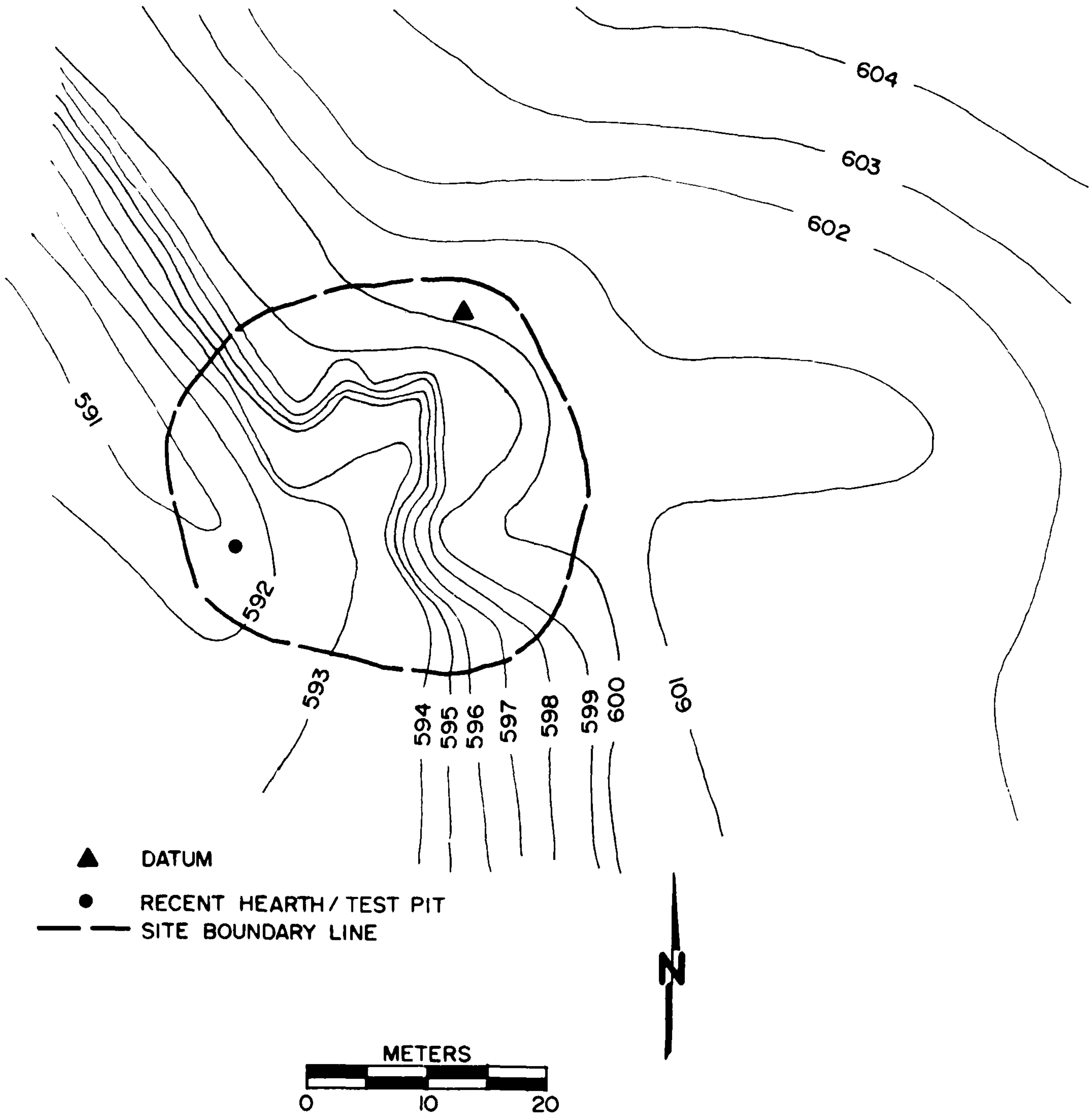


Figure 96 Site Map, Buffalo Bill's Cave.

Plate 11. Photographs of Buffalo Bill's Cave.

Chapter 7.2

Paleontology and Paleoecology of the North Cove Site, 25HN164

J. D. Stewart

Introduction

Until quite recently knowledge of the vertebrate fauna of Late Pleistocene sediments north of the Kansas-Oklahoma border was quite limited. What little was known was based primarily on remains of macrovertebrates. The last decade has witnessed a marked increase in collection of micro-vertebrate remains in this region, but adequate published documentation exists for only three sites in all of northern Kansas and Nebraska. Likewise, very little published data exists for invertebrate fossils from these sediments. The survey of molluscs in the Peoria Loess of Kansas by Leonard (1952) constitutes a major exception. Knowledge of Wisconsinan flora of this region is even more sparse (Voorhies and Corner 1985).

During the summer and autumn of 1983, Phillip Wells (Professor, Department of Botany, University of Kansas), Wayne Ostlie (Graduate Student, Department of Systematics and Ecology, University of Kansas) and the author surveyed exposures of Wisconsinan Age sediments in Kansas, Nebraska and Colorado seeking to increase our understanding of the fauna and flora of this area during the Late Pleistocene Age. On November 6, 1983, we briefly visisted the north shore of Harlan County Lake to look for promising exposures of these sediments. From the east side of North Cove, we recognized an apparent paleo-channel cut into the Peoria Loess on the west side of North Cove. Preliminary investigation yielded aquatic and terrestrial vertebrates and invertebrates, traces of charcoal and indications of a large mammal's skull eroding out of the bank. The molluscan remains identified indicated a probable Late Pleistocene Age, but the vertebrate remains identified were not significantly different from the Holocene fauna. The osteological remains were only slightly mineralized and bleached white from moderate exposure to sun light. On November 23, 1984, the author returned to the site to attempt to more exactly determine the age and extent of the fossiliferous horizons. Wave action had collapsed parts of the cliff and several fossils were observed on the beach. Among these were a bison (*Bison*) mandible, a frog illium and incisors of pocket gopher (*Geomys*) and pine squirrel (*Tamiasciurus*).

A worked flake of heat-treated chert also lay on the beach with these fossils. A sample of clay taken from the cliff produced wood, needles and cones of the white spruce (Picea glauca). The association of abundant plant and animal remains with a possible human occupation in Pleistocene sediments indicated that the site was of major scientific importance. The author notified Roger Grosser of the Kansas City District of the U.S. Army Corps of Engineers. David A. Jackson, Chief of the Natural Resources Management Branch of the Kansas City District, granted permission for the author to collect additional sediment samples.

The preliminary samples of the biota were organized according to the facies, or units lettered in this volume (Fig. 97), from which they were collected. At that time the author had assumed that the sediments were all of approximately the same age. The organic remains in the clay facies form a coherent picture of a biota typical of a Hudsonian or Canadian life zone. The fossils from the sandy facies, however, included several taxa characteristic of warmer climates, as well as the taxa found in the clay facies. This observation raised the possibility of inadvertent faunal mixing. Therefore, during the Corps-sponsored study (July 1985), the author took precautions to sample not only according to appropriately restricted lithologies and levels, but also in restricted lateral increments. These restricted lithologies, facies, or units were assigned letter designations (e.g., A thru O, Fig. 97).

1985 Investigations

Sediment samples from productive levels of the site were screened on the shore in 20 mesh geologic screens. A concerted effort was made so that fossil gastropods were not lost due to floating out of submerged screens. Larger remains discovered during excavation of the sediment samples were supplied with provenience data and stored separately. After several rinsings, the concentrate from each sample was dried and sorted under a 10X dissecting microscope. Most organic remains were removed. Molluscs were concentrated by a two-stage process involving flotation and subsequent swirling and pouring off of the lightest sediment fraction to obtain pelecypods, slug tests and broken gastropod shells. Gastropods were cleaned by boiling them briefly in a small amount of water and then adding a larger amount of cold water, causing them to sink. Specimens not adequately cleaned by this process were cleaned with ultra-sound. Samples intended for radiocarbon dating were enclosed in aluminum foil as soon as they were collected. The volumes of sediment screened from the various units were not equal. The volumes were often limited by exigencies of the preparation of the profile.

Many of the organisms collected from the North Cove site no longer inhabit the Harlan County area. Some of these are rare or unprecedented in published biotas from Quarternary sediments of this region. The following are techniques used to identify some of the more unusual taxa.

Picea glauca - White spruce is distinguished by moderately elongate cones less than 50 mm in length. The cones scales are flexible and have smooth margins that show no peak.

Bufo hemiophrys baxteri - Wyoming toad is the only North American toad species with frontoparietals showing vaulting toward the posterior end and a meeting of the parietal spurs in the midline. The Wyoming toad differs from Canadian toad (*B. h. hemiophrys*) in that the frontal ridges are more medially placed, the carotid artery perforates the otoparietal ridge lateral relative to the frontal ridge and the crests are more elevated in the Wyoming toad.

Lepus americanus - The primary means of identifying snowshoe hare (*L. americanus*) is by measurements of adult limb bones. Measurements of the diameters of the ends of limb bones of snowshoe hare overlap with those of black-tailed jackrabbit (*L. californicus*), but lengths of the respective elements do not. Therefore, visual comparisons for size are generally sufficient to provide a secure decision between the two. The lengths of the limb bones of swamp rabbit (*Sylvilagus aquaticus*) sometimes overlap with those of snowshoe hare, as do some measurements of the diameters of the ends of these bones. The ranges observed for the pertinent parameters of snowshoe hare are:

Distal end of humerus	8.20 mm - 9.80 mm
Distal end of radius	6.35 mm - 7.50 mm
Distal end of femur	12.70 mm - 14.70 mm
Distal end of tibia	11.00 mm - 12.90 mm

It is fortunate that the lengths of the tooth rows of snowshoe hare do not overlap with those of either white-tailed jackrabbit (*L. townsendii*) or swamp rabbit. The ranges observed for snowshoe hare are:

Mandibular tooth row	12.70 mm - 15.70 mm
Maxillary tooth row	12.75 mm - 15.35 mm

All adult specimens of hare and rabbit fossils with known provenience from the North Cove site conform to these measurements.

Spermophilus kimballensis - The Kimball ground squirrel is the probable Pleistocene ancestor of the extant sibling species Richardson's Ground Squirrel (*S. richardsonii*). Methods for identifying Kimball ground squirrel are provided by Neuner (1976) and Stewart (in press).

Tamiasciurus hudsonicus - The pine squirrel may be distinguished from all terrestrial squirrels by the narrowness of the incisors that also have enamel ornamentation consisting of very distinct ridges. The cheek tooth morphology and size differentiate it from other squirrels.

Marmota flaviventris - The yellow-bellied marmot is the largest North American squirrel. The angles formed by the protoconid, mesoconid, and hypoconid of the p4 of the yellow-bellied marmot approximate right angles, creating an open, squarish appearance in the ectostylid. In woodchuck these angles are distinctly acute, giving the ectostylid a pinched and triangular appearance.

Synaptomys borealis - Molars of the northern bog lemming have an occlusal pattern quite different from other lemmings. The M3 of the northern bog lemming and southern bog lemming (*S. cooperi*) show an extreme labial shift of the tooth axis. Of these two, the northern bog lemming shows this shift in the lower molars. Also, the first and second triangles of the lower molars are confluent in the northern bog lemming, but closed in the southern bog lemming. Lingual reentrants of M3 are nearly parallel in the northern bog lemming, but divergent in the southern bog lemming (see Guilday et al. 1964, Fig. 19).

Microtus montanus - The montane vole is one of several species of *Microtus* with a 4-element M2. Like the long-tailed shrew (*M. longicauda*), it has an elongate and posteriorly constricted incisive foramen. It is much smaller than the yellow-cheeked vole (*M. xanthognathus*). None of the palates have associated frontals. Consequently, the presence or absence of ridges cannot be determined. Although it is possible that the long-tailed shrew is present in this material, the specimens that could be checked in excavations from other areas with sediments of this age conform to the mountain vole. The prairie vole (*Pitymys ochrogaster*) has a similar M2, but the M3 and ml-3 differ significantly from the genus *Microtus*. None of the hundreds of arvicolid teeth of those positions collected at the North Cove site belong to the prairie vole.

Microtus xanthognathus - The yellow-cheeked vole and water vole (*M. richardsonii*) are much larger than other North American *Microtus* species. Neither have cementum on the posterior labial reentrant of the M3. The first and second triangles of the m3 of the yellow-cheeked vole are closed, but in the water vole they are confluent (Hall and Cockrum 1953).

Peromyscus maniculatus - The m1 of the white-footed mouse (*Peromyscus leucopus*) has a more massive, bilaterally symmetrical anteroconid than does that of the deer mouse (*P. maniculatus*) (Guilday et al. 1977). This gives the anterior end of the m1 a more acute appearance in the deer mouse.

Zapus princeps - The western jumping mouse has a very shallow anterior fold on the m1; that of the meadow jumping mouse (*Z. hudsonius*) has a very deep one (Kurten and Anderson 1980).

Martes nobilis - The noble marten, which is now extinct, is intermediate in size between the extant martens, American marten (*M. americana*) and fisher (*M. pennanti*). The length of the m1 ranges from 9.6 mm to 11.3 mm in the nobel marten and 10.4 mm to 14.5 mm in the fisher (Anderson 1970). The length of the m1 of the North Cove specimen is 10.1 mm.

Navahoceros fricki - The mountain deer identification is based on the proximal portion of a right scapula larger than that of deer (*Odocoileus*), and slightly smaller than that of wapiti (*Cervus canadensis*). As can be seen in a topotypic scapula of the mountain deer, UNSM 19304, the infraspinous fossa in mountain deer is terminated well above the proximal end of the scapular spine by a prominence formed by the spine's convergence with the ridge arising from the posterior margin. The prominence is seen also in three mountain deer scapulae from San Josiceto Cave (LACM uncataloged) and the specimen from the North Cove site. This prominence does not occur in wapiti, caribou (*Rangifer*), or deer.

Mammut americanum - The identification of American mastodon at the North Cove site is based on the morphology of a cervical vertebra. Olsen (1979) indicated that the neural arch of the third cervical vertebra of mastodon has a more rounded ventral border than the rather peaked condition found in mammoth (*Mammuthus*). The North Cove vertebra conforms to the condition in mastodon.

Stratigraphy and Dating

One diagram and four profiles of the cliff face on the west side of North Cove are shown in Figures 97 through 103. The bedrock exposed along the shore, especially along the southern part of the cliff, is the Upper Cretaceous Pierre Shale Formation. Lying on this is a moderately coarse, cross-bedded sand that produced very few, badly abraded fossils. The cross-bedded sand (Unit A) can be traced along the base of the cliff throughout all of the fossiliferous portions except at the southernmost extremity, where it is truncated by the Peoria Loess.

At the point marked "Profile 2" (Fig. 99), the stratigarphy and paleontology were examined in detail. Here a finer sand mixed with intermittent clay (Unit B) lies on the cross-bedded coarse sand (Unit A). Sands of unit B show no obvious current features. These sands contain more silt than those of unit A. Vertebrate remains are fairly sparse in unit B. The biota from unit B is listed in Table 59.

The overlying horizon, unit C, contains more clay and produced more numerous fossils and a more diverse biota (Table 60) than unit B. A small piece of translucent, vitreous quartz screened from this horizon shows clear evidence of human modification (see Chapter 7.1). Several additional unworked pebbles of this material also came from this horizon.

The lithology of Unit D is similar to unit C, as is the biota (Table 61). In the naturally eroded basal portion of the cliff face, unit D appears to give rise to a low bench that produces Pleistocene fossils for a considerable distance along the shore. A sample of spruce wood yielded a radiocarbon date of 10,730 B.C. (Beta-18188). This should provide a minimum date for the underlying unit C that yielded a retouched flake.

Unit E contains a relatively homogenous deposit of fossiliferous clay as well as the silty sands typical of adjacent horizons. The sand and clay facies were analyzed separately (Tables 62 and 63, respectively). During the 1985 field season, fewer fossils were collected in Unit F than in adjacent horizons. Therefore, Chuck Martin, of the Department of Geography at the University of Kansas, kindly provided another matrix sample from a slightly higher part of unit F. The earlier sample is designated F1, and the second and slightly higher sample is designated F2 (Table 64).

Unit G spans the distance from unit F to the distinctive paleosol that marks the northern half of the

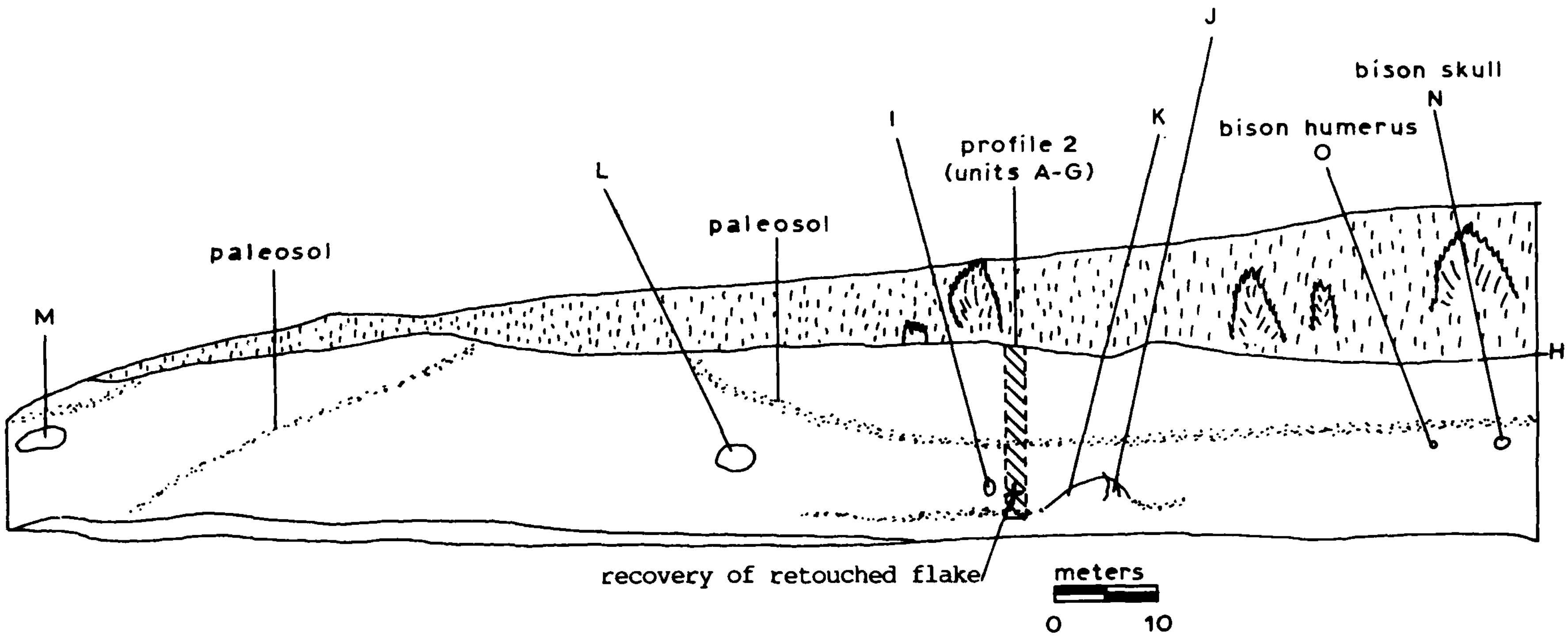


Figure 97. Diagram of cut bank at 25HN164, North Cove site. Letters are designated stratigraphic units from which faunal, botanical and cultural remains have been recovered and are described in text.

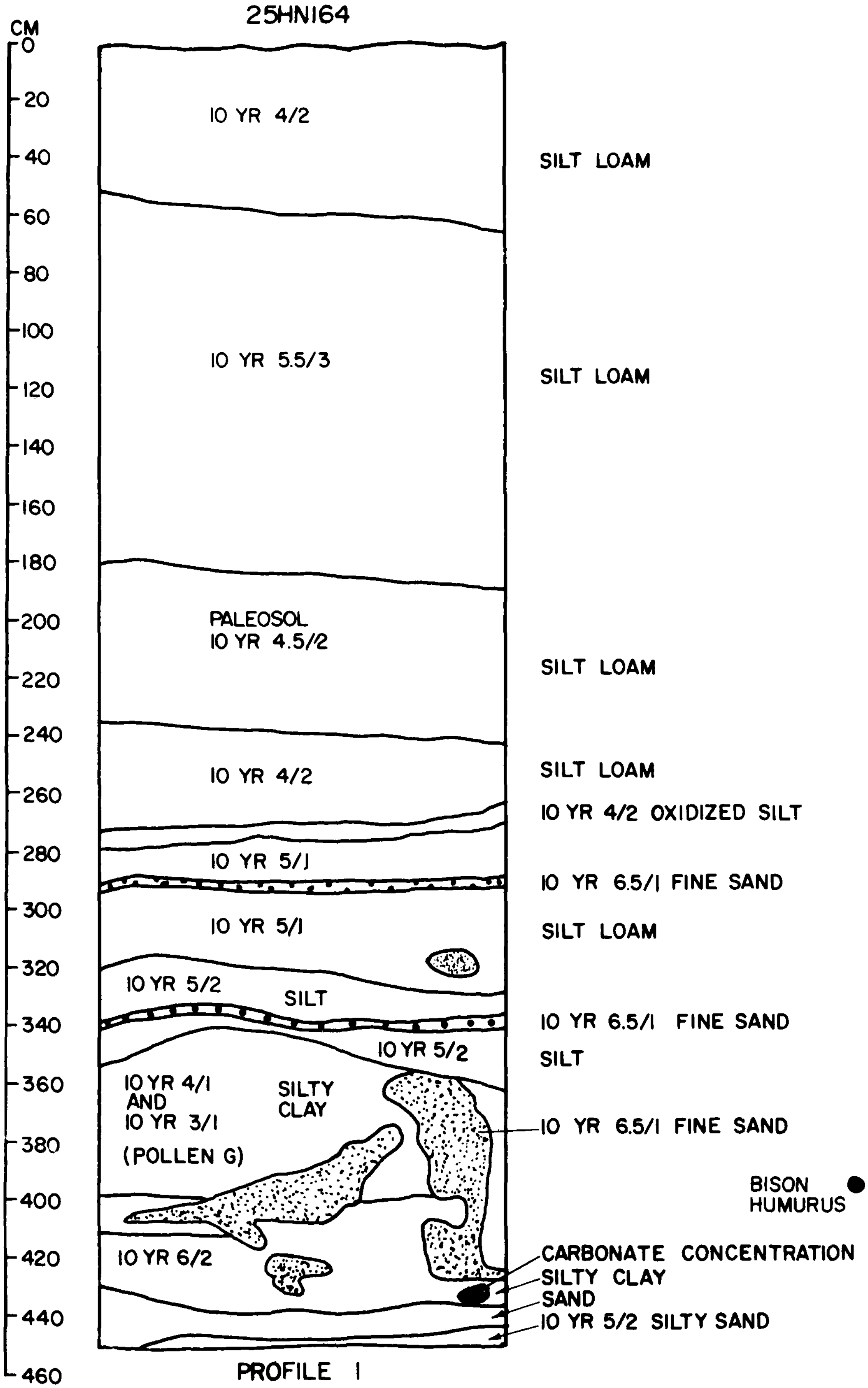


Figure 98. Profile 1 at North Cove site, 25HN164.

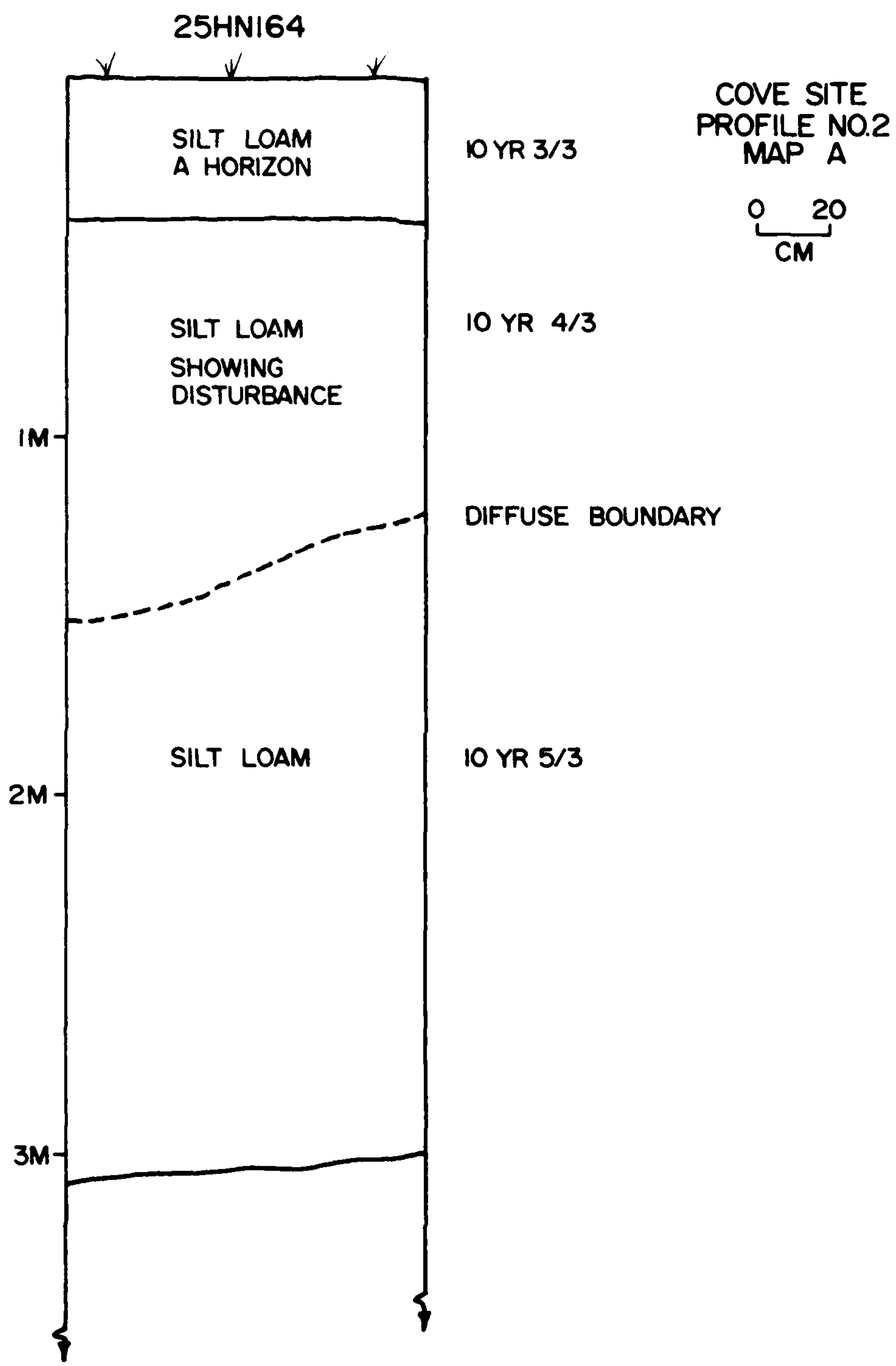


Figure 99. Profile 2, Map A, North Cove site, 25HN164.

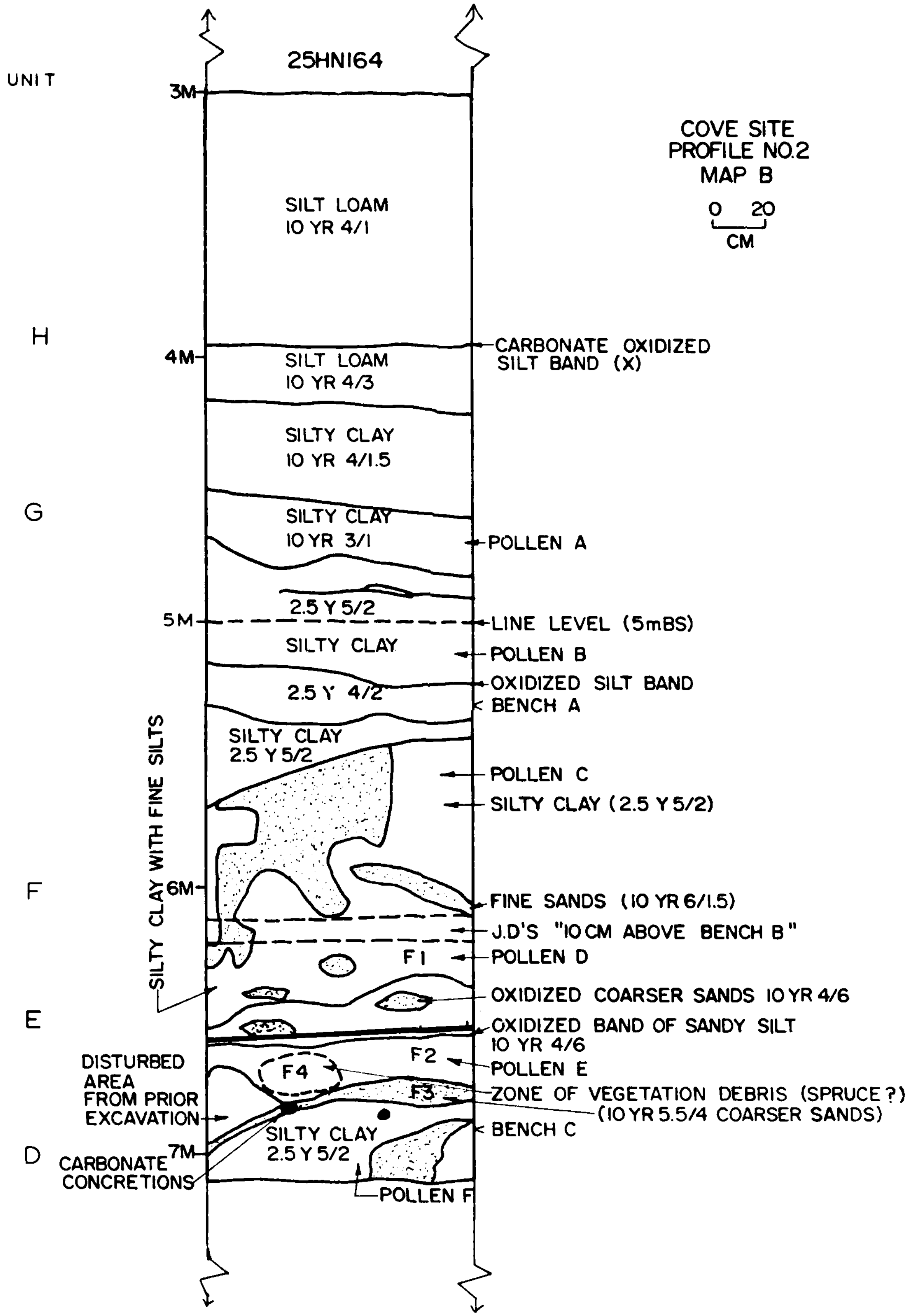
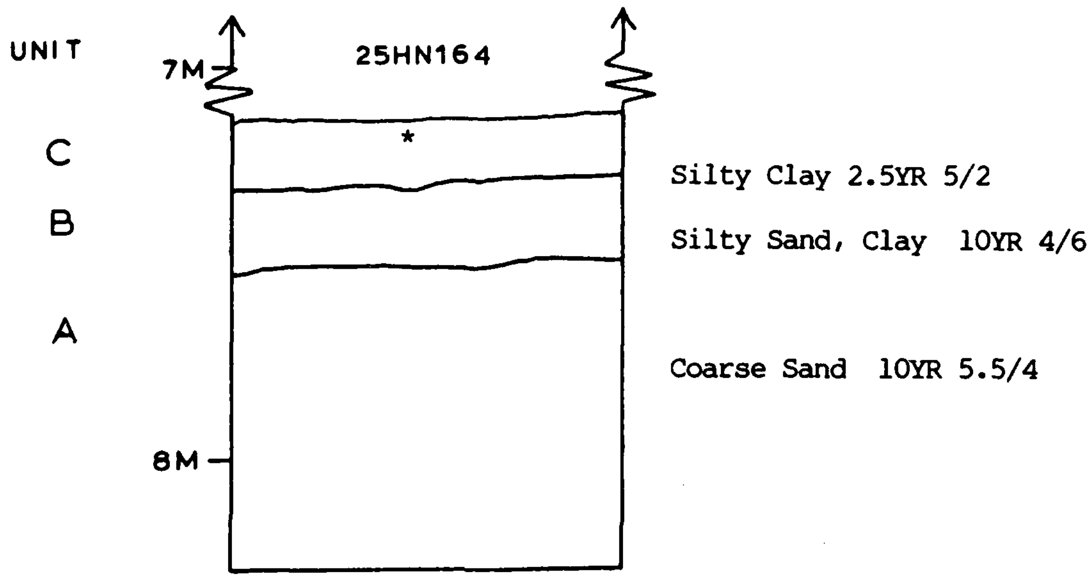


Figure 100. Profile 2, Map B, North Cove site, 25HN164.



* Location of retouched flake

Figure 101 Profile 2, Map C

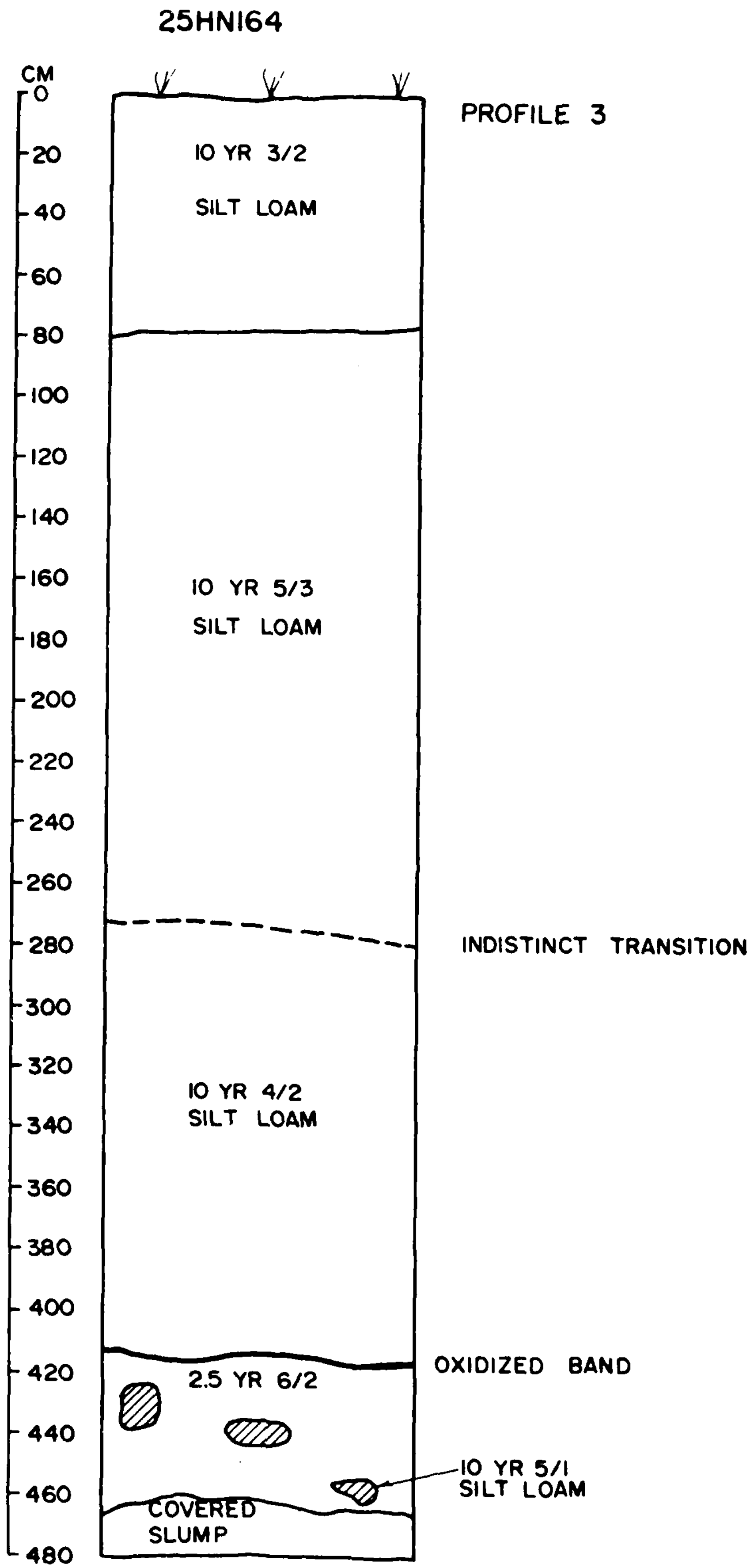


Figure 102. Profile 3, North Cove site, 25HN164.

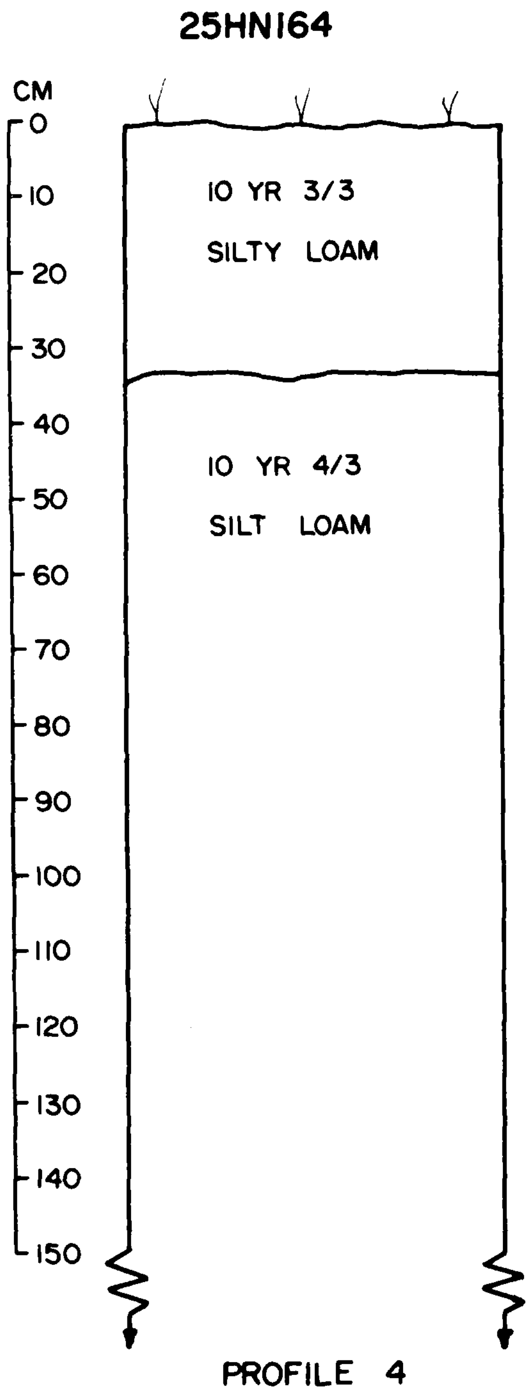


Figure 103. Profile 4, North Cove site, 25HN164.

Table 59

Taxa from Unit B

Picea sp.	spruce	3*
		MNI
Gastrocopta armifera	mollusc	7
Pupilla muscorum	mollusc	2
Vertigo modesta	mollusc	2
Vallonia gracilicosta	mollusc	19
Discus cronkhitei	mollusc	9
Discus shimeki	mollusc	1
Deroceras laeve	mollusc	3
Hawaiia minuscula	mollusc	3
Zonitoides arboreus	mollusc	3
succineids	molluscs	25
total		74
fish		
Bufo sp.	toad	
Rana sp.	frog	
bird		
? *Lepus americanus*	snowshoe hare	1
Tamiascirus hudsonicus	chicakaree, pine squirrel	1
Spermophilus kimballensis	Kimball ground squirrel	1
Thomomys talpoides	northern pocket gopher	1
Microtus pennsylvanicus	meadow vole	2
total		6

Table 60

Taxa from Unit C

		MNI
Picea glauca	white spruce, needles, wood	
Fossaria dalli	mollusc	
Gastrocopta armifera	mollusc	
Columella alticola	mollusc	
Pupilla muscorum	mollusc	
Pupilla blandi	mollusc	
Vertigo gouldi	mollusc	
Vertigo modesta	mollusc	
Vallonia gracilicosta	mollusc	
Cionella lubrica	mollusc	
Carychium exiguum	mollusc	
Discus cronkhitei	mollusc	
Discus shimeki	mollusc	
Deroceras laeve	mollusc	
Euconulus fulvus	mollusc	
Nesovitrea electrina	mollusc	
Zonitoides arboreus	mollusc	
succineids	molluscs	
Stizostedion sp.	sauger	
cyprinid	minnow	
Bufo hemiophrys baxteri	Wyoming toad	2
Rana sp.	frog	9
Ambystoma tigrinum	tiger salamander	1
Thamnophis radix	western plains garter snake	1
snake		1
passeriform	song bird	1
Sorex cinereus	masked shrew	1
cf. Lepus americanus	snowshoe hare	1
Spermophilus kimballensis	Kimball ground squirrel	1
Spermophilus tridecemlineatus	thirteen-lined ground squirrel	1
Thomomys talpoides	northern pocket gopher	2
Microtus pennsylvanicus	meadow vole	9
Microtus montanus	montane vole	1
Microtus xanthognathus	yellow-cheeked vole	4
Synaptomys sp.	bog lemming	1
Clethrionomys gapperi	southern red-backed vole	4

Table 60 cont.

Phenacomys intermedius	heather vole	1
Peromyscus maniculatus	deer mouse	1
Zapus princeps	western jumping mouse	1
cf. *Martes pennanti*	fisher	1
total		29
lithic artifact		1

cliff. The lithology is that of a silty clay. Flecks of vegetation can be seen when lumps from the upper part of the horizon G are split along the bedding plane (Fig. 100). No identifiable fossils were found in unit G. A few were, however, collected from equivalent horizons to the north and south (Table 65). One, a cervical vertebra of an extinct bison (Bison occidentalis) (Unit N), yielded a radiocarbon date of 9,070.635 B.C. (UGa-5475). Another, a humerus of an extinct bison (Bison cf. occidentalis) (from stratum O) (Fig. 97), produced a radiocarbon date of 9,415.865 B.C. (UGa-5480). No fossils were recovered from the paleosol, but it is designated unit H.

A large lens of clay containing numerous spruce sticks, needles and cones lies 0.6 to 1.2 meters south of profile 2 at the level of unit F. This spruce-clay lens is designated as unit I. Vertebrate and invertebrate fossils are relatively uncommon in this clay. Tables 66 and 67 list the identified remains found in this lens. Samples of spruce wood from this lens yielded radiocarbon dates of 11,015.135 B.C. (UGa-5476) and 11,150.140 B.C. (UGa-5477). A third spruce sample lying at the base of the cliff, and presumably from this same concentration, yielded a date of 12,750.100 B.C. (Beta-12286).

To the north of profile 2 at the level of the lower part of unit F is a large concavity at the cliff base. It was formed by slumping and wave erosion. Two very sandy deposits lay at the north and south ends of this concavity. The sandy deposit on the north end forms a curious vertical structure (unit J) at least one meter in height. It is bounded by more typical silty sands. The weathered surface of this structure shows a profusion of molluscs and small bones. A metacarpal of a bison (Bison sp.) from unit K (the south deposit) yielded a radiocarbon date of 8,170.405 B.C. (UGa-5474). Because one or both of these units had produced a collection of taxa atypical of a glacial environment, each of these were sampled in order to discern the source of these taxa. The identified taxa from units J and K are listed in Tables 68 and 69, respectively.

Two additional samples are noted. Midway between the cross-bedded sands and the point below which the paleosol of unit H begins to merge with the modern soil (Fig. 97), a small sample of molluscs was collected (unit L, Table 70). A mollusc sample from the Peoria Age loess (unit M) at the southern extremity of the cliff was also collected. These gastropods and a few isolated mammal remains also from the Peoria Age loess (Fig. 97) are listed in Table 71.

Table 61

Taxa from Unit D

Picea	spruce		
		MNI	percentage
Fossaria dalli	mollusc	6	0.07
Gastrocopta armifera	mollusc	299	3.73
Columella alticola	mollusc	13	0.16
Pupilla blandi	mollusc	51	0.64
Pupilla muscorum	mollusc	54	0.67
Vertigo gouldi	mollusc	124	1.55
Vertigo modesta	mollusc	258	3.22
Vallonia gracilicosta	mollusc	5585	69.72
Cionella lubrica	mollusc	17	0.21
Carychium exiguum	mollusc	10	0.12
Discus cronkhitei	mollusc	494	6.17
Discus shimeki	mollusc	165	2.06
Helicodiscus parallelus	mollusc	10	0.12
Punctum minutissimum	mollusc	6	0.07
Deroceras laeve	mollusc	8	0.10
Euconulus fulvus	mollusc	13	0.16
Nesovitrea electrina	mollusc	59	0.74
Hawaiia minuscula	mollusc	114	1.42
Zopnitoides arboreus	mollusc	286	3.57
succineids	molluscs	436	5.45
total		8011	99.99

Stizostedion canadense	sauger	
cyprinid	minnow	
catostomid	sucker	
		MNI
Bufo hemiophrys baxteri	Wyoming toad	8
Rana sp.	frog	25
? *Pseudacris*	chorus frog	1
Ambystoma tigrinum	tiger salamander	1
Bartramia longicauda	upland sandpiper	1
Turdus cf. *migratorius*	robin	1
cf. *Lagopus* sp.	ptarmigan	1
passeriforms	song bird	4
Sorex arcticus	arctic shrew	3
Sorex cinereus	masked shrew	7
Sorex cf. *palustris*	water shrew	1
Lepus americanus	snowshoe hare	2
Thomomys talpoides	northern pocket gopher	7
Spermophilus kimballensis	Kimball ground squirrel	2
Spermophilus tridecemlineatus	thirteen-lined ground squirrel	2

Table 61 cont.

		MNI
Marmota cf. _flaviventris_	yellow-bellied marmot	1
Tamias minimus	least chipmunk	1
Tamiasciurus hudsonicus	chicakaree, pine squirrel	1
Microtus montanus	montane vole	6
Microtus pennsylvanicus	meadow vole	22
Microtus xanthognathus	yellow-cheeked vole	9
Synaptomys borealis	northern bog lemming	2
Clethrionomys gapperi	southern red-backed vole	8
Phenacomys intermedius	heather vole	1
Ondatra zibethicus	muskrat	1
Peromyscus cf. _leucopus_	white-footed mouse	2
Zapus princeps	western jumping mouse	2
Bison cf. _occidentalis_	extinct bison	1
total		81

Table 62

Taxa from sand facies of Unit E

		MNI
Fassaria dalli	mollusc	
Gastrocopta armifera	mollusc	
Columella alticola	mollusc	
Pupilla muscorum	mollusc	
Vertigo gouldi	mollusc	
Vertigo modesta	mollusc	
Vallonia gracilicosta	mollusc	
Cionella lubrica	mollusc	
Carychium exiguum	mollusc	
Discus cronkhitei	mollusc	
Discus shimeki	mollusc	
Deroceras laeve	mollusc	
Nesovitrea electrina	mollusc	
Hawaiia minuscula	mollusc	
Zonitoides arboreus	mollusc	
succineids	molluscs	
Stizostedion sp.	sauger	
cyprinid	minnow	
Rana sp.	frog	8
Bufo hemiophrys baxteri	Wyoming toad	
Ambystoma tigrinum	tiger salamander	1
bird		
large		1
small		1
Sorex cinereus	masked shrew	1
Sorex arcticus	arctic shrew	1
Thomomys talpoides	northern pocket gopher	1
Spermophilus tridecemlineatus	thirteen-lined ground squirrel	1
Clethrionomys gapperi	southern red-backed vole	2
Ondatra zibethicus	muskrat	1
Microtus pennsylvanicus	meadow vole	1
total		7

Table 63

Taxa from clay facies of Unit E

Picea	spruce, needles and charcoal		
		MNI	percentage
Fossaria dalli	mollusc	3	0.32
Gastrocopta armifera	mollusc	68	7.16
Gastrocopta holzingeri	mollusc	1	0.11
Columella alticola	mollusc	5	0.53
Pupilla blandi	mollusc	4	0.42
Pupilla muscorum	mollusc	16	1.69
Vertigo gouldi	mollusc	49	5.16
Vertigo modesta	mollusc	28	2.95
Vallonia gracillicosta	mollusc	496	52.21
Cionella lubrica	mollusc	5	0.53
Carychium exiguum	mollusc	13	1.37
Discus cronkhitei	mollusc	40	4.21
Discus shimeki	mollusc	15	1.58
Punctum minutissimum	mollusc	27	2.84
Deroceras laeve	mollusc	4	0.42
Euconulus fulvus	mollusc	1	0.11
Nesovitrea electrina	mollusc	18	1.89
Hawaiia minuscula	mollusc	20	2.11
Zonitoides arboreus	mollusc	28	2.95
succineids	molluscs	109	11.47
total		950	99.98

Stizostedion sp.	sauger	
cyprinid	minnow	
		MNI
Rana sp.	frog	3
Bufo hemiophrys baxteri	Wyoming toad	1
Ambystoma trigrinum	tiger salamander	1
Sorex cinereus	masked shrew	1
Tamias minimus	least chipmunk	1
Thomomys talpoides	northern pocket gopher	1
Clethrionomys gapperi	southern red-backed vole	1
Synatomys borealis	northern bog lemming	1
Microtus pennsylvanicus	meadow vole	1
Microtus xanthoganthus	yellow-cheeked vole	3
Microtus sp.	vole	1
Peromyscus maniculatus	deer mouse	1
total		11

Table 64

Taxa from Unit Fl

		MNI
Gastrocopta armifera	mollusc	
Columella alticola	mollusc	
Pupilla muscorum	mollusc	
Vertigo gouldi	mollusc	
Vertigo modesta	mollusc	
Vallonia gracilicosta	mollusc	
Cionella lubrica	mollusc	
Discus cronkhitei	mollusc	
Discus shimeki	mollusc	
Punctum minutissumum	mollusc	
Hawaiia minuscula	mollusc	
Zonitoides arboreus	mollusc	
succineids	molluscs	
Stizostedion sp.	sauger	
cyprinid	minnow	
Spermophilus kimballensis	Kimball ground squirrel	2
Spermophilus idecemlineatus	thirteen-lined ground squirrel	1
Microtus pennsylvanicus	meadow vole	1
Microtus xanthognathus	yellow-cheeked vole	1
Microtus pennsylvanicus or montanus	meadow vole or montane vole	2
Clethrionomys gapperi	southern red-backed vole	1
total		8

Table 64 cont.

Taxa from Unit F2

taxon	common name	MNI
Pisidium sp.	mollusc	
Fossaria dalli	mollusc	
Gyraulus circumstriatus	mollusc	
Physa anatina	mollusc	
Gastrocopta armifera	mollusc	
Gastrocopta contracta	mollusc	
Gastrocopta sp.	mollusc	
Pupilla blandi	mollusc	
Vertigo gouldi	mollusc	
Vertigo modesta	mollusc	
Vertigo cf. *ovata*	mollusc	
Vallonia gracilicosta	mollusc	
Cionella lubrica	mollusc	
Carychium exiguum	mollusc	
Discus cronkhitei	mollusc	
Discus shimeki	mollusc	
Helicodiscus parallelus	mollusc	
Punctum minutissimum	mollusc	
Deroceras laeve	mollusc	
Euconulus fulvus	mollusc	
Nesovitrea electrina	mollusc	
Hawaiia minuscula	mollusc	
Zonitoides arboreus	mollusc	
succineids	molluscs	
cyprinid	minnow	
Bufo sp.	toad	
Rana sp.	frog	
Ambystoma tigrinum	tiger salamander	
bird		
Sorex sp.	shrew	2
Lepus sp.	hare	1
Thomomys talpoides	northern pocket gopher	1
Spermophilus cf. *kimballensis*	Kimball ground squirrel	1
Microtus pennsylvanicus	meadow vole	1
Microtus xanthognathus	yellow-cheeked vole	1
Microtus pennsylvanicus or *montanus*	meadow vole montane vole	4
cricetid	New World rats and mice	1
Total		12

Table 65

Taxa from Unit G

Blarina brevicauda brevicauda	short-tailed shrew
Martes nobilis	noble marten
Bison occidentalis	extinct bison

Table 66

Taxa from August sample of Unit I

		MNI
Picea glauca	white spruce, numerous needles, twigs, a few cone scales and cones	
insects		
Gastrocopta armifera	mollusc	1
Vallonia gracilicosta	mollusc	2
Discus cronkhitei	mollusc	2
Zonitoides arboreus	mollusc	1
succineids	molluscs	1
total		7
catostomid	sucker	1
Rana sp.	frog	1
Spermophilus kimballensis	Kimball ground squirrel	1
Microtus pennsylvanicus	meadow vole	1

Table 67

Taxa from February sample of Unit I

Picea glauca	white spruce, numerous needles, twigs and a few cones		
bryophytes	mosses		
insects			
		MNI	percentage
Gastrocopta armifera	mollusc	20	0.67
Columella alticola	mollusc	4	0.13
Pupilla blandi	mollusc	4	0.13
Pupilla muscorum	mollusc	11	0.37
Vertigo gouldi	mollusc	50	1.68
Vertigo modesta	mollusc	65	2.18
Vertigo cf. *ovata*	mollusc	5	0.17
Vallonia gracilicosta	mollusc	2467	82.92
Carychium exiguum	mollusc	29	0.97
Discus cronkhitei	mollusc	89	2.99
Discus shimek	mollusc	37	1.24
Deroceras laeve	mollusc	13	0.44
Euconulus fulvus	mollusc	4	0.13
Nesovitrea electrina	mollusc	2	0.07
Hawaiia minuscula	mollusc	1	0.03
Zonitoides arboreus	mollusc	3	0.10
succineids	molluscs	171	5.75
total		2975	99.97

Stizostedion sp.	sauger	
Rana sp.	frog	
Anas discors	blue-winged teal	
		MNI
soricid		1
Lepus americanus	snowshoe hare	1
Tamias minimus	least chipmunk	1
Tamiasciurus hudsonicus	chicakaree, pine squirrel	1
Zapus princeps	western jumping mouse	1
Thomomys talpoides	northern pocket gopher	1
Clethrionomys gapperi	southern red-backed vole	1
Microtus pennsylvanicus	meadow vole	1
Ondatra zibethicus	muskrat	1
total		9

The relative ages of the Peoria Age loess (unit M) and the Woodfordian zones in profile 2 and adjacent units (units B through F, I and K) is unclear, since no loess occurs near profile 2. The author knows of no reason to correlate the paleosol below the Peoria Age loess with the paleosol of unit H. There are good reasons for expecting them to be of quite different ages. First, they are not the same color. The soil below the loess is a reddish-brown; unit H is a dark grey. There are no known radiocarbon dates that are younger than 12,050 B.C. for the Peoria Age loess in Kansas or Nebraska. The soil below the Peoria Age loess is probably not significantly younger than that date. Unit H overlies reliable dates as young as 9,070 B.C.

The relationship of the Woodfordian units (units B through F, I and K) to the Peoria Age loess are likewise unclear. For biostratigraphic reasons one might expect them to be roughly contemporaneous. Some Peoria Age loess radiocarbon dates are older than those from unit I and none is younger. If the Woodfordian units are as young or younger than the Peoria Age loess, then some undetected unconformity exists between them and the sediment separating them laterally from the Peoria Age loess (unit M). The only faunal sample from those intervening sediments is that of unit L. All that can be said of these few molluscs (Table 70) is that they are of Pleistocene Age. In all likelihood these intervening sediments are of pre- Woodfordian age. They must, however, post-date unit A.

Many taxa were screened from slumped sediments that had to be moved in order to expose the base of the cliff. Many others were collected prior to the Corps-sponsored excavations. Because of initial ignorance of the fact that these samples represented multiple time horizons, some were inadvertently mixed. Taxa found in the slumped sediments or mixed samples, but not found elsewhere in the excavation, are listed in Table 72.

Paleoecology

The following discussion addresses the temporal, paleoecological and paleoclimatological interpretations in ascending temporal order. The basal cross-bedded sands (unit A) are of unknown post-Miocene Age. This assessment is based on a magnum (carpal of lower front leg) of a horse (Equus sp.). The sedimentological structures and the broken and abraded fossils that unit A contains attest to deposition in swift flowing, permanent water.

The faunal samples of units B through F and K are entirely indistinguishable from one another. The clays and

Table 68

Taxa from Unit J (North Spring)

		MNI	
ostracodes 114/2 =		57	
Pisidium sp. 154/2 =		77	
			percentage
Fossaria dalli		35	3.89
Gyraulus circumstriatus	mollusc	71	7.89
Physa anatina	mollusc	8	0.89
Strobilops labyrinthica	mollusc	45	5.00
Gastrocopta armifera	mollusc	20	2.22
Gastrocopta contracta	mollusc	59	6.56
Gastrocopta sp.	mollusc	13	1.44
Columella aticola	mollusc	1	0.11
Vertigo cf. *gouldi*	mollusc	3	0.33
Vertigo cf. *milium*	mollusc	12	1.67
Vertigo modesta	mollusc	8	2.22
Vertigo ovata	mollusc	25	2.78
Vallonia gracilicosta	mollusc	73	8.11
? *Vallonia parvula*	mollusc	1	0.11
Cionella lubrica	mollusc	5	0.56
Carychium exiguum	mollusc	4	0.44
Discus cronkhitei	mollusc	223	24.78
Discus shimeki	mollusc	1	0.11
Helicodiscus parallelus	mollusc	30	3.33
Punctum minutissimum	mollusc	1	0.11
Deroceras laeve	mollusc	85	9.22
Euconulus fulvus	mollusc	3	3.33
Nesovitrea electrina	mollusc	39	4.33
Hawaiia minuscula	mollusc	15	1.67
Zonitoides arboreus	mollusc	25	2.78
succineids	molluscs	82	9.11
total		900	99.99

fish

		MNI
Bufo sp.	toad	1
Rana sp.	frog	9
Ambystoma tigrinum	tiger salamander	1
Regina grahami	Graham's crayfish snake	1
Thamnophis radix	plains garter snake	1
Thamnophis proximus	western ribbon snake	1
snakes	(total of 30 vertebrae)	2
turtle		1
Sturnella sp.	meadowlark	1

Table 68 cont.

		MNI
Sorex cinereus	masked shrew	6
Sorex arcticus	arctic shrew	1
chiropteran	bat	1
leporid	hare, rabbit	1
Thomomys talpoides	northern pocket gopher	2
Spermophilus tridecemlineatus	thirteen-lined ground squirrel	1
Spermophilus sp.	ground squirrel	1
Clethrionomys gapperi	southern red-backed vole	1
Microtus pennsylvanicus	meadow vole	5
Microtus xanthognathus	yellow-cheeked vole	1
Pitymys cf. *ochrogaster*	prairie vole	
Zapus hudsonius	western jumping mouse	1
total		22

Table 69

Taxa from Unit K

Picea	spruce, charcoal		
		MNI	
Pisidium sp.		1	
			percentage
Fossaria dalli	mollusc	11	1.81
Gastrocopta armifera	mollusc	20	3.29
Columella alticola	mollusc	3	0.49
Pupilla muscorum	mollusc	5	0.82
Vertigo gouldi	mollusc	46	7.57
Vertigo modesta	mollusc	47	7.73
Vallonia gracilicosta	mollusc	243	39.97
Cionella lubrica	mollusc	1	0.16
Carychium exiguum	mollusc	5	0.82
Discus cronkhitei	mollusc	62	10.20
Discus shimeki	mollusc	15	2.47
Helicodiscus parallelus	mollusc	1	0.16
Punctum minutissimum	mollusc	1	0.16
Deroceras laeve	mollusc	6	0.99
Euconulus fulvus	mollusc	3	0.49
Nesovitrea electrina	mollusc	4	0.66
Hawaiia minuscula	mollusc	9	1.48
Zonitoides arboreus	mollusc	25	4.11
succineids	molluscs	101	16.61
total		608	99.99

Stizosteidion sp.	sauger	
cyrpinid	minnow	
castostomid	sucker	
		MNI
Bufo hemiophrys baxteri	Wyoming toad	2
Rana sp.	frog	8
Ambystoma tigrinum	tiger salamander	1
bird, tetraonine	grouse	1
small		1
Sorex arcticus	arctic shrew	2
Sorex cinereus	masked shrew	1
cf. Lepus americanus	snowshoe hare	1
Thomomys talpoides	northern pocket gopher	2
Tamiasciurus hudsonicus	chicakaree, pine squirrel	1
Spermophilus kimballensis	Kimball ground squirrel	2
Microtus montanus	montane vole	2
Microtus pennsylvanicus	meadow vole	5
Microtus sp.	vole	3

Table 69 cont.

Microtus xanthognathus	yellow-cheeked vole	1
Microtus cf. *richardsonii*	water vole	1
Clethrionomys gapperi	southern red-backed vole	2
Phenacomrs intermedius	heather vole	1
Zapus cf. *princeps*	western jumping mouse	1
Bison cf. *occidentalis*	extinct bison 8,170.405 B.C. (UGa-5474)	1
total		26

Table 70

Taxa from Unit L

		MNI
Vallonia gracilicosta	mollusc	18
Cionella lubrica	mollusc	2
Discus cronkhitei	mollusc	4
Hawaiia minuscula	mollusc	4
succineids	molluscs	2
total		30

Table 71

Taxa from Unit M (Peoria Loess)

		MNI	percentage
Gastrocopta armifera	mollusc	26	5.84
Columella alticola	mollusc	1	0.22
Pupilla blandi	mollusc	50	11.24
Pupilla muscorum	mollusc	51	11.46
Vertigo sp.	mollusc	2	0.45
Vertigo modesta	mollusc	4	0.90
Vallonia gracilicosta	mollusc	249	55.96
Discus cronkhitei	mollusc	3	0.67
Discus shimeki	mollusc	7	1.57
Helicodiscus sp.	mollusc	2	0.45
Punctum minutissimum	mollusc	5	1.12
succineids	molluscs	45	10.11
total		445	99.99

Thomomys cf. talpoides	northern pocket gopher
Spermophilus kimballensis	Kimball ground squirrel
ungulate	hoofed mammal

Table 72

Taxa accumulated on the shore

Rana sp.	frog
Lepus sp.	hare
Thomomys cf. talpoides	northern pocket gopher
Geomys sp.	pocket gopher
Tamiasciurus cf. hudsonicus	chicakaree, pine squirrel
Cynomys sp.	prairie dog
Microtus sp.	vole

Table 72 cont.

Navahoceros fricki	mountain deer
Bison cf. *occidentalis*	extinct bison
Mammut americanum	American mastodon
Provenience Uncertain	
Ectopistes migratorius	passenger pigeon
Mustela nivalis	least weasel

sands of units B through F and K produce both aquatic and terrestrial fauna. In the well-collected molluscan samples (units D and E), the same 19 taxa are present. Nearly half are extra-local. *Vallonia gracilicosta* composes over 50 percent of the total number of individuals of gastropods. *Fossaria* is the only aquatic or semi-aquatic mollusc. Taxa indicative of Woodfordian age (*Columella alticola*, *Discus shimeki* and *Vertigo modesta*) represent approximately five percent of the total number of individual gastropods. The faunal sample from F2 indicates a more aquatic aspect among the molluscs. Ecologically, it seems very similar to unit J.

The majority of vertebrate taxa in units B through F and K (Tables 59 through 64 and 69) are either extra-local or extinct. The fishes are predominantly sauger (*Stizostedion* sp.) with occasional cyprinids and catostomids. The amphibians are consistently Wyoming toad (*Bufo hemiophrys baxteri*), frog (*Rana* sp.) and tiger salamander (*Ambystoma tigrinum*). There are no reptilian remains except for very rare snake vertebrae. Masked shrew (*Sorex cinereus*) is the common shrew, with few arctic shrew (*S. arcticus*). Snowshoe hare is the only lagomorph. The only geomyid is pocket gopher (*Thomomys* sp.). Marmot (*Marmota*), chipmunk (*Tamias*) and pine squirrel are present in some samples, but rare. Kimball ground squirrel and thirteen-lined ground squirrel (*S. tridecemlineatus*) are more common. Meadow vole (*Microtus pennsylvanicus*) is the most common arvicolid, with fewer yellow-cheeked vole montane vole, Gapper's red-backed vole (*Clethrionomys gapperi*), northern bog lemming, heather vole (*Phenacomys* intermedius), and muskrat (*Ondatra zibethicus*). Western jumping mouse is the only zapodid.

The molluscs attest to a wooded area with some openings and some deciduous trees. The scarcity of aquatic molluscs in an alluvial deposit is curious but not without precedence. Sauger (*Stizostedion canadense*) indicates permanent water with a vegetated or muddy substrate. The numerous shrew fossils indicate nearby water as do Gapper's red-backed vole (*Clethrionomys*) and bog lemming (*Synaptomys*). Yellow-cheeked vole is characteristically an inhabitant of the taiga. The snowshoe hare requires brushy cover and pine squirrel indicates a considerable stand of coniferous trees. Spruce wood and charcoal fragments in these units verify this prediction. The absence of any ictalurid remains among the numerous fish fossils from the Woodfordian alluvial units is consistent with their absence from Woodfordian faunas in northern Kansas. Ictalurids require warmer water temperatures for spawning than do many cyprinids, catostomids, and sauger. It appears that at least the upper reaches of the Kansas River drainage experienced cooler water temperatures than today. Likewise, the scarcity of snakes and the absence of lizards and turtles in the Woodfordian units indicate cooler ambient temperatures. These observations confirm the findings of Preston (1979) that radiocarbon dated faunas from southwestern Kansas indicate markedly reduced lizard and turtle components relative to pre-Wisconsinan assemblages as well as to the modern fauna. In accordance with the idea that cool temperatures limited the diversity of reptiles at this time is the fact that the only identified snake in this horizon, plains garter snake (Thamnophis radix), is a live bearer. Egg laying snakes generally do not range as far north as do ovoviviparous taxa because egg incubation is temperature dependent.

Unit I is a clay deposit containing voluminous remains of white spruce. It is located 0.7 to 1.2 meters south of profile 2 at the level of unit E and the lower part of F. The branches and twigs of spruce and, in some cases, even the needles were visibly aligned. Most elongate remains pointed in an east-southeast direction with a few directed east-northeast to northeast. As mentioned above, spruce samples from this unit yielded radiocarbon dates ranging from 12,750 to 11,015 B.C. The August sample from this unit (Table 66) yielded few molluscan or vertebrate remains, but a sample collected in February (Table 67) yielded an extensive molluscan fauna and a dozen vertebrate taxa. The molluscs and vertebrates of the two samples are consistent with each other and are similar to those from units B to F and K. The author believes there is no reason to question whether they are generally contemporaneous.

While the author cannot explain why the bison metacarpal from unit K produced such a young date as 8,170 B.C, the date is rejected as being representative of the microfauna. The microfauna sample is indistinguishable from those of units B through F. A date of less than 10,550 B.C. is highly improbable based on other dates from the North Cove site and similar biotas in the Plains.

It is of interest to note that Evans (1972) maintained, in the context of European molluscan faunas, that molluscan faunas with high percentages of Vallonia indicate grassland or open conditions. But in unit I, which has more direct evidence for woodland than any other Pleistocene sample in the western Plains, the percentage of Vallonia is higher than any other the author has observed in either alluvium or loess.

A relatively small sediment sample of the Peoria Loess (unit M) at the North Cove site produced at least 11 taxa of molluscs (Table 71). Also found within the Peoria Loess at various points along the cliff were northern pocket gopher (Thomomys cf. talpoides), Kimball ground squirrel, and an ungulate rib. Specimens of woodland muskox (Symbos cavifrons) and mammoth (Mammuthus sp.) were also collected in the Peoria Age loess a few kilometers west of the North Cove site. These taxa are consistent with taxa collected by the author from Peoria Age loess elsewhere in Nebraska, Kansas and Colorado. These animals as well as spruce charcoal collected within the Peoria Age loess at several different sites indicate that the loess was deposited in a cooler and moister upland environment than characterizes southern Nebraska today. This upland environment included considerable amounts of trees with open areas. The presence of the molluscs Columella alticola and Discus shimeki in this sample indicates a Woodfordian age. Therefore, unit M must represent the upper part of the Peoria Age loess (Leonard 1952). Dates for the Peoria Loess exposures producing these two taxa in Kansas include 15,980.550 B.C. (GX-9355) and 12,500.140 B.C. (Beta-9320).

Unit G and correlative horizons to the north and south produced no invertebrates but did yield a limited but interesting group of mammalian fossils. Most notable was a mandible of nobel marten which became extinct in the late Holocene time (Grayson 1984). Several post-cranial elements of bison of large size were collected from these exposures, and a partial cranium proved to be extinct bison (B. occidentalis).

While bison occured in a variety of Pleistocene habitats, nobel marten was somewhat more restricted in its habitat requirements. Martens are semi-arboreal and the presence of considerable amounts of trees would provide a source for the numerous flecks of charcoal and carbonized plant fragments in this unit. Nobel marten, unlike the extant species of the genus, was probably not restricted to boreal woodlands (Grayson 1984). The only other vertebrate taxon found here, short-tailed shrew (Blarina brevicauda brevicauda), is principally an inhabitant of deciduous woodland. The shift from coniferous to deciduous woodland may have started in this area during this period. Dates obtained from bison bones, including a vertebra associated with the extinct bison skull, from this horizon were 9,415.865 B.C. (UGa-5480) and 9,070.635 B.C. (UGa-5475). These dates fall within the Two-Creekan substage of the Wisconsinan glacial stage. The uniformly fine grain size and the finely divided fragments of vegetation point to deposition of this unit in a calm aquatic environment.

The sample from north spring, unit J, produced a group of organisms distinct from those of Woodfordian alluvial units (B through F and K). The molluscan fauna do not include any _Pupilla_. The molluscan fauna _Columella alticola_ and _Discus shimeki_ are each represented by a single specimen and may well be contaminants. Most Discus from this unit are bleached white and have a chalky surface. There are, however, five specimens that have a moderately to strongly pigmented dorsal surface and a shiny surface. The sole specimen of _D. shimeki_ is among these. Present in unit J, but not in the preceding units, are the molluscan fauna _Gyraulus circumstriatus_, _Physa anatina_, _Strobilops labyrinthica_ and _Gastrocopta contracta_. _Pisidium_ is abundant. _Discus cronkhitei_ and _Deroceras laeve_ compose unusually high percentages whereas _Vallonia gracilicosta_ composes an unusually low percentage.

Further differences can be noted between the vertebrate samples of unit J and the Woodfordian units. The toad (Bufo) in unit J is not identified to species, but it is not Wyoming toad. The number of snake vertebrae exceeds those from units B through F and K combined by an order of magnitude. Turtles were not represented in any other unit. The only arvicolids in unit J are a possible prairie vole, southern red-backed vole (_Clethrionomys gapperi_), meadow vole, and yellow-cheeked vole. Of the identified vertebrates, only arctic shrew (_Sorex arcticus_), northern pocket gopher (_Thomomys talpoides_) and yellow-cheeked vole are extra-local. The record of yellow-cheeked vole in this unit is based on a single tooth that also may have originated in the surrounding Woodfordian sediments.

The molluscan fauna _Strobilops_ indicates a deciduous arboreal component in the flora. Prairie vole may indicate deciduous woods or grasslands. The molluscan fauna _Gastrocopta contracta_ is an eastern species that does not occur as far west as Harlan County today. Four molluscs from this unit are aquatic or semi-aquatic, but all of the species identified can withstand periodic dessication. The molluscs, therefore, do not necessarily indicate permanent water. The turtle and several molluscan species indicate warmer ambient temperatures than during deposition of the Woodfordian sediments. Even so, all three identified snake species are ovoviviparous. Unit J is younger than the Woodfordian units but may be older than unit G. The fauna of unit J shows many similarities to the Litchfield local fauna of Sherman County, Nebraska (Voorhies and Corner 1985). The molluscan fauna _Strobilops_ and _Gastrocopta contracta_ in addition to the meadow jumping mouse and prairie vole are found in combination with masked shrew (_Sorex cinereus_), southern red-backed vole, yellow-cheeked vole, montane vole, and northern pocket gopher in both faunas. Unit J and the Litchfield local fauna may date from the Two-Creekan substage.

Discussion

The only unit that produced any human cultural remains was unit C. Dates from adjacent horizons range from 12,750 to 10,730 B.C. The only faunal components of that unit that might be of cultural significance are the sauger or walleye, the unidentified passeriform, the snowshoe hare, the fisher and possibly the larger rodents. All of these could be potential food items. Both the hare and the fisher would be valuable sources of fur. Overlying Woodfordian units produce larger samples of essentially the same fauna and indicate that bison, red squirrel, marmot, muskrat, grouse, ptarmigan, Swainson's hawk, blue-winged teal and a sucker were also present. All of these could be food sources and most had useful pelages. Mastodon and mountain deer, an extinct cervid, were among megafaunal components accumulated on the shore and may have come from the Woodfordian zone.

Unit G and equivalent horizons produced no cultural indicators. Extinct bison (*Bison occidentalis*) is the most common taxon in this horizon. A projectile point was found, associated with extinct bison (*Bison occidentalis*) skeletons showing cut marks were found 180 kilometers to the southwest of Harlan County Lake in Logan County, Kansas. These skeletons were dated at 8,485 and 8,295 B.C. (Rogers and Martin 1984). While these dates are anomalously young for the time frame proposed by Haynes (1971) for Clovis sites, they accord with dates for unit G. Both Clovis and Folsom projectile points have been found within a few kilometers of the North Cove site (Paul Prettyman, local resident, Alma, Nebraska, personal communication 1985).

Many species found at this site are of particular interest for biogeographic and chronologic reasons. White spruce has not been identified from any other site in Nebraska, and provides the first macrofossils of the Pleistocene flora of Nebraska. Recent research has questioned whether such remains could be found in Nebraska (Voorhies and Corner 1985). It confirms the prediction, based on modern occurrences of white spruce in the Black Hills, that climax conifers were wide-spread in the Great Plains during the Pleistocene time (Clements and Chaney 1937).

Sauger has a very poorly known fossil record, having been previously reported from very late Pleistocene Age sites in the Great Lakes region (Smith 1981). This is the oldest and only record in the Plains. Wyoming toad has never before been reported as a fossil. These remains prove that it had differentiated from Canadian toad by Woodfordian times. This record is hundreds of kilometers east of, and much lower than, the relict population in the Laramie, Wyoming area.

There are no published reports of arctic shrew from Wisconsinan Age sites in Nebraska, although it is known from several localities in Kansas. The only published records for snowshoe hare in the Plains are from Wisconsinan Age sediments in northern Kansas and central and northern Nebraska (Stewart 1984; Voorhies and Corner 1985). Many of the rodents are of interest. Northern bog lemming, yellow-bellied marmot, and western jumping mouse were previously unknown as fossils in Nebraska. Voorhies and Corner (1985) did cite an indeterminant marmot from the Litchfield local fauna. There are no other reports of nobel marten or fisher from the Plains. The noble marten was previously unknown east of central Colorado. Similarly, all previous records of mountain deer were from the Rocky Mountains or adjacent areas (Kurten and Anderson 1980).

Conclusions

A human modified artifact was recovered from sediments that produced an extensive Wisconsinan biota. The biostratigraphic indicators as well as the radiocarbon dates from this horizon indicate a Late Woodfordian age. A higher level produced a small fauna and Two-Creekan dates. The immediate area was inhabited by humans at that time, but no cultural remains were found in this level at the North Cove site.

Many of the taxa identified at the North Cove site have never been found before in Nebraska. Some have never been reported in the Plains and at least one has no previously published fossil record. The North Cove site is potentially of great archaeological and paleontological significance and should either be stabilized or systematically excavated.

Pollen and Phytolith Analyses of the North Cove Site

Glen G. Fredlund

Introduction

Although some of the most important Paleo-Indian sites in North America have come from the Central Great Plains, there is relatively little concrete evidence regarding Late Pleistocene and Early Holocene environments of the region. This scarcity of regional data makes the North Cove site, 25HN164, important for both archaeology and Quarternary studies. The North Cove site contains well-preserved pollen and macrobotanical evidence of local vegetation during Late Wisconsinan time. Eleven North Cove sediment samples stratigraphically bracketing the deposits were analyzed for pollen and opal phytoliths. Unfortunately, except for the waterlogged deposits themselves, pollen preservation was poor. Rather than a complete pollen record for Late Pleistocene and Early Holocene time, the North Cove deposit record probably represents a composite of the Late Wisconsinan (ca. 12,500 B.C. to 10,500 B.C.) local vegetation. This pollen record appears to represent an open, mixed spruce-deciduous forest along the Republican River Valley.

Opal phytolith samples from somewhat younger strata add another dimension to the North Cove paleoenvironment study. One sample associated with a bison skull and another from a probable Early Holocene paleosol yielded tremendous quantities of grass phytoliths. These slightly more recent phytoliths appear significantly different from those documented from the Pleistocene deposits. Although inconclusive in themselves, these phytoliths suggest the presence of numerous grasses in great abundance. These records of grass phytoliths probably signal the development of the Holocene grasslands.

Sample Stratigraphy and Chronology

Eleven sediment samples were analyzed. Most of these, samples A through F and the sorted sand sample, came from North Cove profile number 2 (Figs. 99-101). Sample A, the uppermost of this set of samples, is from a buried Holocene paleosol. Three samples, labeled E1, E2 and E3 came from the zone of well-preserved botanical macrofossils including spruce wood, needles and cones. This spruce layer has yielded three radiocarbon dates: 12,820.100 B.C., 11,150.140 B.C. and 11,015.135 B.C. The spruce-zone pollen and phytolith samples were not collected at the same time as the other samples from profile 2 and are not presented in any particular stratigraphic or chronological order. The sample of sorted sand was collected from one of the large plumes of sand above the spruce zone on profile 2. The additional samples include Sample G from North Cove profile 1 and a sample from within the bison skull (with associated vertebra dated to 9070.635 B.C.).

Laboratory Methods

From 15 to 18 grams of sediment, analytically weighed, were processed from each sample. A modified heavy-liquid flotation procedure was employed in the concentration of pollen and phytoliths from these subsamples (Johnson and Fredlund 1985; Fredlund n.d.). This procedure consists of five steps: (1) removal of carbonates with hydrochloric acid; (2) dispersal in sodium pyrophosphate (0.1 molar solution) and decantation of soluble organics, colloidal organics and clays; (3) heavy-liquid fractionation of pollen and other silt-size organic particles from the clastic mineral fraction in zinc bromide (specific gravity up to 2.35); and (4) alcohol dehydration of light, pollen-bearing fractions and storage in silicon fluid (viscosity 2000 c.s., refractive index about 1.45). Phytolith fractions were stored dry and mounted in refractive index oil (viscosity 150 c.s., refractive index about 1.52).

Permanent mounted slides of the residues were systematically searched using a Zeiss photomicroscope. At least one complete slide was searched for each sample. Because pollen concentrations were low, some of the pollen counts represent counts of four complete slides. Phytolith counts typically required less than a complete transect of a slide.

Estimates of pollen concentration were calculated by introducing a known number of exotic spores into each sample during the initial stage of pollen extraction. The ratio of counted spores to introduced spores can then be used to estimate the total number of indigenous pollen and spores recovered (Benninghoff 1962).

Pollen Data

Most of the pollen samples contained too little pollen for significant quantitative pollen analysis. There appears to be a very narrow window of preservation in these sediments. Only those samples from the water-logged spruce zone, E1, E2 and E3 contained abundant well preserved pollen. The presence of common pollen taxa in the samples with poor preservation is shown in Table 73.

Except in Sample A, spruce pollen is present throughout the set of samples, including the sand sample. Also present in all of the samples except A are microscopic bits of

Table 73

Presence/Absence of Pollen Taxa for Poorly Preserved Samples (Sd is the sand sample and Bi is the sample associated with the bison skull. See Table 74 for samples E1, E2 and E3)

Pollen Taxa	Sample A	B	C	D	F	G	Sd	Bi
Arboreal								
Picea (spruce)		X	X	X	X	X	X	X
Pinus (pine)	X	X			X	X	X	X
Juniperus (juniper)	X			X	X	X	X	
Populus (popular)				X	X	X	X	
Quercus (oak)	X				X		X	
Salix (willow)				X	X		X	
Rosa (rose)				X				X
Other AP			X	X	X		X	
Non-Arboreal								
Poaceae (grass)	X			X	X	X	X	X
Artemisia (sage)		X		X	X		X	
Ambrosia (ragweed)	X			X	X	X	X	X
Cheno-Am (goosefoot, pigweed)	X					X	X	
Cyperaceae (sedge)	X				X	X	X	
Other NAP	X		X	X	X	X	X	X
Total Count	19	10	12	55	47	25	48	18
Concentration (grains/gram)	402	204	176	328	493	462	587	325

spruce wood. The extent of alluvial turbation, mixing and redeposition of pollen and other fossils is not yet clear. The occurrence of these microfossils in the intrusive bodies of sorted sands clearly indicates that redeposition and mixing are occurring. Because of this problem of redeposition, it is impossible to tell which of the higher strata contained in situ spruce. The problem of mixing also affects the confidence placed on the quantitative interpretations of pollen from the spruce zone.

Most of the other pollen taxa identified in samples with poor preservation are plants present in the region today. The few exceptions are also arboreal taxa. These include hazelnut (Corylus) and Carpinus type from sample D and bunchberry (Cornus cf. canadensis) from the sand sample. Also, a single grain of linden (Tilia) was found in sample C. This is the only pollen taxa identified from the poorly preserved samples that have not been found in the spruce zone samples.

In contrast, the three samples from the spruce zone contained a diversity and great abundance of pollen permitting basic quantitative analysis (Table 74). Estimates of pollen concentration in these sediments ranges into the tens of thousands of pollen grains per gram of sediment. This is 100 times greater than that estimated for the samples with poor preservation. Even in these spruce zone samples, however, preservation is less than pristine. Typically about 15 percent of the pollen is damaged, deteriorated or obscured such that identification is indeterminable.

The three spruce zone samples give a consistent signal of the Late Wisconsinan Age vegetation. Typically about 60 percent of the primary pollen sum (AP + NAP) is arboreal. The most important of these arboreal pollen (AP) taxa is spruce (Picea), comprising about 35 percent of the primary pollen sum. The most common other arboreal taxa include pine (Pinus), juniper (Juniperus), poplar (Populus) and oak (Quercus). The presence of pine in the relative frequencies occurring here (averaging 5 percent) is not significant. This amount of pine pollen is probably due to long-distance transport but may also represent a few trees growing locally. The consistent occurrence of juniper pollen indicates that one or more of the shrubby junipers commonly associated with spruce forest were present at North Cove. Poplar pollen is notoriously under-represented in pollen records. The consistent presence of poplar pollen even in low percentages indicates that aspen or other poplar, such as the balsam poplar, were important trees in the North Cove Late Pleistocene vegetation. Also present, but not

Table 74

Percentage of Pollen From North Cove Deposits

Pollen Taxa	Sample E1	E2	E3
Arboreal:			
Larix (?)		0.9	0.4
Abies		0.9	
Picea (spruce)	30.5	37.0	35.2
Pinus (pine)	3.0	4.8	7.4
Juniperus (juniper)	3.8	3.0	2.6
Populus (popular)	4.7	2.1	3.7
Salix (willow)	2.1	0.9	
Betula (birch)	0.8	0.9	
Alnus (alder)	0.8		1.1
Corylus (hazelnut)		0.9	0.4
Acer negundo (box elder)	0.8		4.5
Quercus (oak)	5.1	0.4	1.8
Carya (hickory)	0.4	0.4	0.4
Juglans (walnut)	0.8	2.6	0.4
Carpinus type	0.4	0.4	1.1
Fraxinus nigra (black ash)			0.4
Rosa type (rose)		0.4	1.9
Sambucus (elderberry)			0.4
Elaeagnus (olive)		0.4	
Shepherdia (buffaloberry/ rabbitberry)		1.3	
Myrica	0.4	0.4	
Vitus (grape)		0.4	
Total AP	54.0	58.1	61.7
Non-Arboreal:			
Cyperaceae (sedge)	17.9	16.4	7.8
Poaceae (grass)	12.7	12.6	7.5
Artemisia (sage)	3.8	4.8	1.9
Ambrosia (ragweed)	4.2	3.0	2.6
Iva type (iva)	1.7	0.4	
MS type	1.3	1.3	2.2
HS type	0.4		0.7
Liguláflorae	0.4	0.4	
Tubuliflorae	0.4	0.4	0.4
Cheno-Am (goosefoot/ pigweed)	0.4		6.0
Apiaceae (parsley)	0.8		1.9
Solanaceae (nightshade)	0.4		0.4
Lamiaceae (mint)			0.7
Caryophyllaceae (pink)			1.1
Polygonum (buckwheat)	0.4	0.9	0.7
Rumex (sorrel/dock)	0.4		0.4

Table 74 cont.

Fabaceae (bean)		0.4	0.4
Primula (primrose)			0.7
Brassica type (mustard)			0.7
Sanguisorba	0.4		
Plantago (plantain)		0.9	
Malvaceae (mallow)	0.4		
Urtica (nettle)	0.4	0.4	1.5
Total NAP	46.0	41.9	38.3
SUM (AP + NAP)	236	230	267

Percentages of Pollen From North Cove Deposits: Aquatic, Recycled and Indeterminate Pollen

Pollen Taxa	Sample E1	E2	E3
Semi-Aquatic:			
Liliaceae (lilly)			0.3
Polygala (milwart)			0.3
Sagittaria (arrowhead)	0.3	0.6	
Typha (cattail)	1.3	0.3	
Ranunculaceae (buttercup)	1.3		
Potamogeton (pondweed)	0.3		
Equisetum (horsetail)	0.3		
Total Aquatic	2.9	0.9	0.6
Other Spores:			
Pteridium (bracken)		1.0	1.4
Osmunda (osmunda)	0.3	1.0	0.6
Lycopodium (clubmoss)	0.9	0.6	0.6
Other Triletes	1.3	1.0	1.1
Cystopteris (bladder fern)	1.3	5.8	2.2
Athyrium (lady fern)	1.7	0.6	
Total Spores	4.5	10.0	5.9
Recycled (Pre-Quaternary)	0.3	0.6	2.0
Indeterminate (Unidentifiable)	12.9	14.5	17.0
Total Pollena and Spore Count	302	311	358
Concentration (K grains/gram)	13.8	16.3	19.0

regionally dominant, were a variety of other deciduous arboreal taxa. The most common of these probably was oak. The diversity of other deciduous pollen taxa listed in Table 74 together sum to a significant portion of the pollen record.

It is always difficult to judge what portion of a non-arboreal pollen (NAP) is strictly local and site specific and how much is regional. Most of the North Cove spruce zone NAP could be the result of marshes surrounding the site; however, based on recent findings in eastern Kansas (Fredlund and Juamann 1986a, 1986b), and similarities to this record, it is believed that the dominant regional vegetation may have been open aspen parklands or grovelands. Spruce was probably far more common in mesic and fire-protected localities such as river valleys. The consistent presence of poplar and the relatively high overall percentage of NAP, especially Poaceae, in the North Cove deposits are consistent with this regional hypothesis.

Phytolith Data

Many of the assumptions underlying quantitative analysis of opal phytoliths have never been tested (Wilding 1977; Fredlund et al. 1985). Even the basic descriptions and definition of phytolith forms are incomplete. Given this, it is not reasonable to place much emphasis on the North Cove phytolith record. The principal use of phytolith analysis here is in the identification of major subfamilies of Poaceae, the grasses. In spite of redundancy and multiplicity of forms, phytolith classification within the Poaceae does appear to be taxonomically and environmentally significant (Twiss et al. 1969; Twiss 1983; Brown 1984).

Typically about 250 to 300 medium to large (5 to 50) microns), silt-size, siliceous particles were counted for each of the sample concentrations. Opal, volcanic ash and other non-opal particles were identified by their morphology, refractive index and other optical properties. Charcoal and other organic fragments were not counted. This assay of the siliceous silts in the extraction residue showed that the majority were opal (Table 75). There is a significant increase in the relative abundance of volcanic ash shards within the mixed deposits. These ash shards have been recycled from older Pleistocene or Tertiary ash deposits of the region. Recycled volcanic ash appears to be particularly common in the Peorian Loess of central Nebraska (Fredlund et al. 1985). Note that only one of the spruce zone samples, E2, has been processed for phytoliths.

Included as biogenic opal are all regular, recognizable phytolith forms, irregularly shaped particles of opal and

Table 75

Percentages of Biogenic Opal, Volcanic Ash, and Other Non-Opal Particles Based on Total Particles Counted Per Sample

	Sample								
	A	B	C	D	El	F	G	Sd	Bi
Volcanic Ash	1.2	18.0	24.0	32.6	28.6	27.0	12.0	24.5	1.0
Other Non-Opal	0.4	1.5	2.2	0.4	0.7	0.0	1.4	0.7	1.0
Biogenic Opal	98.0	80.5	73.8	67.0	70.0	73.0	86.0	74.8	98.0
Total Particles Counted	253	194	229	270	283	318	286	302	305

Table 76

Percentages of Opal Microfossil Groups Based on Sum of Opal Particles Counted

Group	Sample								
	A	B	C	D	El	F	G	Sd	Bi
Diatoms, etc.	5.2	5.1	2.4	5.5	14.5	20.3	11.4	11.5	22.4
Regular Forms	66.3	39.1	32.0	34.3	22.0	31.5	66.6	19.5	34.4
Irregular Forms	28.5	55.8	65.6	61.2	63.5	48.2	22.0	69.0	43.2
Total Opal Count	249	156	169	181	200	232	246	226	299

Table 77

Percentage of Regular Phytolith Classes (Forms) Based on Sum of Regular Forms Counted

Class	Sample								
	A	B	C	D	El	F	G	Sd	Bi
Diagnostic	68.3	57.3	51.9	46.4	31.9	56.2	64.7	54.6	50.9
Elongate	31.5	29.5	33.3	43.5	47 7	30.1	24.4	36.4	31.3
Other Poaceae	4.2	6.6	5.5	3.2	4.5	2.7	8.5	4.5	4.4
Non-Poaceae	6.0	6.6	9.3	6.5	15.9	11.0	2.4	4.5	13.4
Total Regular Form Count	165	61	54	62	44	73	164	44	103

Table 78

Percentages of Diagnostic Grass Subfamily Phytolith Forms Based on the Sum of Diagnostic Forms Counted

Diagnostic Form	Sample								
	A	B	C	D	El	F	G	Sd	Bi
Panicoid	5.5	16.4	7.4	8.1	9.0	9.6	3.7	8.4	13.4
Chloridoid	13.9	6.6	1.9	9.7	2.3	8.2	8.5	4.2	11.9
Festucoid	80.6	77.0	90.7	82.2	88.7	82.2	87.8	87.4	74.7
Total Diagnostic Count	96	35	28	29	14	41	106	24	70

other siliceous microfossils that include diatoms, spong spicules and chrysostomate cysts (Table 76). The other fossils are all at least semi-aquatic organisms. They have their greatest abundance in and approximate to the spruce zone and in the bison sample. The relative abundance of irregular opal particles probably reflects the input of trees and shrubs to the assemblage. The largest percentages of irregular forms come within or adjacent to the spruce zone. Most of the regularly shaped forms identified here are from the Poaceae.

Several classes of regular forms were recognized (Table 77). The majority of these were Poaceae types. These include the three classes of diagnostic forms, the elongate class and other Poaceae forms including bulliforms and tricomes. Regularly shaped non-grass forms were relatively less common. As expected, they occur in somewhat higher percentages in and adjacent to the spruce zone.

The diagnostic classes in Table 78 (Lobate, Saddle and other grass phytoliths with trapezoidal cross-section) are as defined by Twiss et al. (1969) and modified by Twiss (1983) and Brown (1984). Although there is some redundancy in the occurrence of these forms, overall they do reflect the presence of grass sub-families. The lobate forms are generally diagnostic of the Panicoideae subfamily (including bluestem, panicum and indiangrass). The saddle forms are most abundant in the Chloridoid tribe, Eragrostoideae subfamily (most importantly grama and buffalograss). Rectangular and oval phytoliths with trapezoidal cross-sections occur in many grasses but are most abundant in the Festucoid (Pooideae) subfamily (including wheatgrass and fescues).

The significance of the differences between the diagnostic grass subfamily assemblages is not clear. The higher percentage of Chloridoid forms occurring in sample A, the Holocene paleosol, probably represent the presence of hot, xeric growing-season adapted grasses; however, these as well as the warm, mesic-adapted Panicoid forms occur regularly throughout the record. As with the pollen, turbation from alluviation may be to blame. On the other hand it is possible that some of the panicoid grasses common to the eastern Great Plains today persisted in the region throughout Wisconsinan time. This question appears unresolvable at this time.

The phytolith record tends to indicate that the local vegetation was mixed grass steppe during the development of the paleosol above the lower deposits. Some of the younger Pleistocene samples (B, Bi and possibly G) also hint that a greater diversity of grasses was present. The main body of samples from around the lower deposits indicates an abundance of Festucoid phytolith-producing grasses. However, given the unexplored assumptions of phytolith production, transportation, deposition and preservation, these conclusions are conjectural.

Summary

Fossil-bearing deposits at the North Cove site, 25HN164, contain abundant pollen from the open, mixed spruce-deciduous forest of Late Wisconsinan time. Included in this Republican River Valley forest were white spruce, pine, juniper, aspen, boxelder, oak, hornbeam, alder, hazel, willow, ash, hickory, walnut, birch, silverberry, soapberry and elder. The regional vegetation of the uplands away from the river valley is uncertain. Recently discovered evidence in eastern Kansas (Fredlund and Jaumann 1986) suggests a more open, less diverse vegetation such as aspen parkland or groveland in the uplands. The occurrence of aspen and relatively high frequencies of non-arboreal pollen from North Cove is consistent with this interpretation.

Early Holocene conditions at North Cove are less well documented. The deeply buried paleosol above the alluvial deposits probably represents an early Holocene period of geomorphological stability. The age of this horizon remains problematic. Sediment samples from this buried soil lack spruce wood and pollen but do contain poorly preserved grass and other non-arboreal pollen. In addition the phytolith assemblage from this zone is distinctly different from that recovered from the Late Pleistocene deposits. Grass phytoliths including some diagnostic of warm-climate adapted grasses occur in greater quantities in these sediments. These data suggest a steppe vegetation of mixed grasses. It is important that the absolute age of this paleosol be established. If it is the Early Holocene (Brady) soil, the North Cove data may also provide evidence for the Holocene migration and establishment of the dominant grasses of the Central Great Plains.

Chapter 8

Lithic Studies

Kenneth L. Brown

Introduction

The recognition, recording, description and explanation of variability in tools has long been an established goal in archaeology. In published reports it is impractical to describe and explain each artifact recovered from a site. A more critical objection to merely describing and explaining each specimen individually is the failure to make generalizations which are a first step in all science (Dunnel 1971:18; Hempel 1952:1). It is imperative to develop a procedure to group specimens based upon empirical observations in order to comprehend variability within and between the artifacts. In order to achieve the above goal, a set of classes are constructed by means of which the specimens can be defined. The following are descriptions of classes of stone artifacts recovered during field investigations at Harlan County Lake. The classes of stone tools are based on general morphological characteristics. Two coding systems (Tables 79 and 80) were used for recording attributes for chipped stone artifacts. Because of the low frequency of ground stone artifacts, they are described separately.

FLAKES

Definition: Any piece of chert, flint or raw material that has been removed from a larger mass by the application of force and that has at least one of several distinguishing characteristics present: (1) a striking platform remnant; (2) point of percussion or force; (3) erralieure; (4) bulb of force; (5) compression rings; (6) termination; (7) platform preparation; (8) previous flake scars; (9) arris. Flakes that are less than two or three centimeters along the axis of force are sometimes referred to as chips. Chips are often removed by a pressure flaking technique. Blades are a special type of flake that are at least twice as long as they are wide. Blades usually have parallel lateral edges. Potlids are not true flakes but are usually circular in form and have a lenticular cross-section. Potlids are formed by exposing certain types of stone (i.e., cherts and flints) to high temperatures (i.e., in a fire) that causes fracture of the stone due to release of moisture. Three forms of flakes were recorded: (1) primary decortication (cortex on the entire dorsal surface); (2) secondary decortication (cortex on part of dorsal surface); and (3) interior (no cortex).

Table 79

Coding Form Used For Unmodified Chipped Stone Artifacts

Column	Museum Catalog
1-15	Unit Number and Excavation Level
16	Artifact Type
	1-flake
	2-chip
	3-blade
	4-potlid
17	Artifact Part Present
	1-complete
	2-proximal end (striking platform remnant, bulb)
	3-distal end (termination)
	4-medial fragment (lacks proximal and distal ends)
18	Cortex
	1-present
	2-absent
19	Artifact Type
	0-not applicable
	1-chunk/shatter
20	Heat Treated
	1-present
	2-absent
21	Raw Material Type
	1-Pennsylvanian Cherts
	2-Permian Cherts (Flint Hills Flint)
	3-Niobrarite (Republican River jasper, Smoky Hills jasper)
	4-Green Quartzite
	5-Pink or Flattop Chalcedony, light purple/pink
	6-Pink or Flattop Chalcedony, dark purple/brown
	7-Nebraska local gravels
	8-Ogallalo Formation petrified wood
	9-Plate or Badlands Chalcedony
	10-Burlington Cherts
	11-Unknown
	12-Basalt
	13-c.f. Alabates Chert
	14-Solid Quartzite, Spannish Diggings
	15-Quartz
23-27	Maximum Length, mm (see Fig. 104)
28-32	Maximum Width, mm (see Fig. 104)
33-37	Maximum Thickness, mm (see Fig. 104)
38-40	Weight, gr

Table 80

Coding Form Used for Modified Chipped Stone Artifacts

Column	Museum Catalog
1-15	Unit Number and Excavation Level
16-17	Tool Code
	1-projectile point
	2-end scraper
	3-side scraper
	4-disto-lateral scraper
	5-graver
	6-notch
	7-knife
	8-denticulate
	9-chopper
	10-core
	11-preform
	12-retouched flake
	13-resharpening flake, biface
	14-resharpening flake, uniface
	15-tested material
	16-drill
18	Heat Treated
	1-no
	2-yes
19-20	Raw Material Type (same as above for unmodified chipped stone)
21-25	Maximum Length, mm (see Fig. 104)
26-30	Maximum Width, mm (see Fig. 104)
31-35	Maximum Thickness, mm (see Fig. 104)
36-38	Weight, gr
39-41	Edge Angle, (nearest five degrees) (see Fig. 104)
42	Tool Modification
	1-uniface
	2-biface
43-	Wear Type (description, i.e., rounding, crushing, step faceting, etc.)

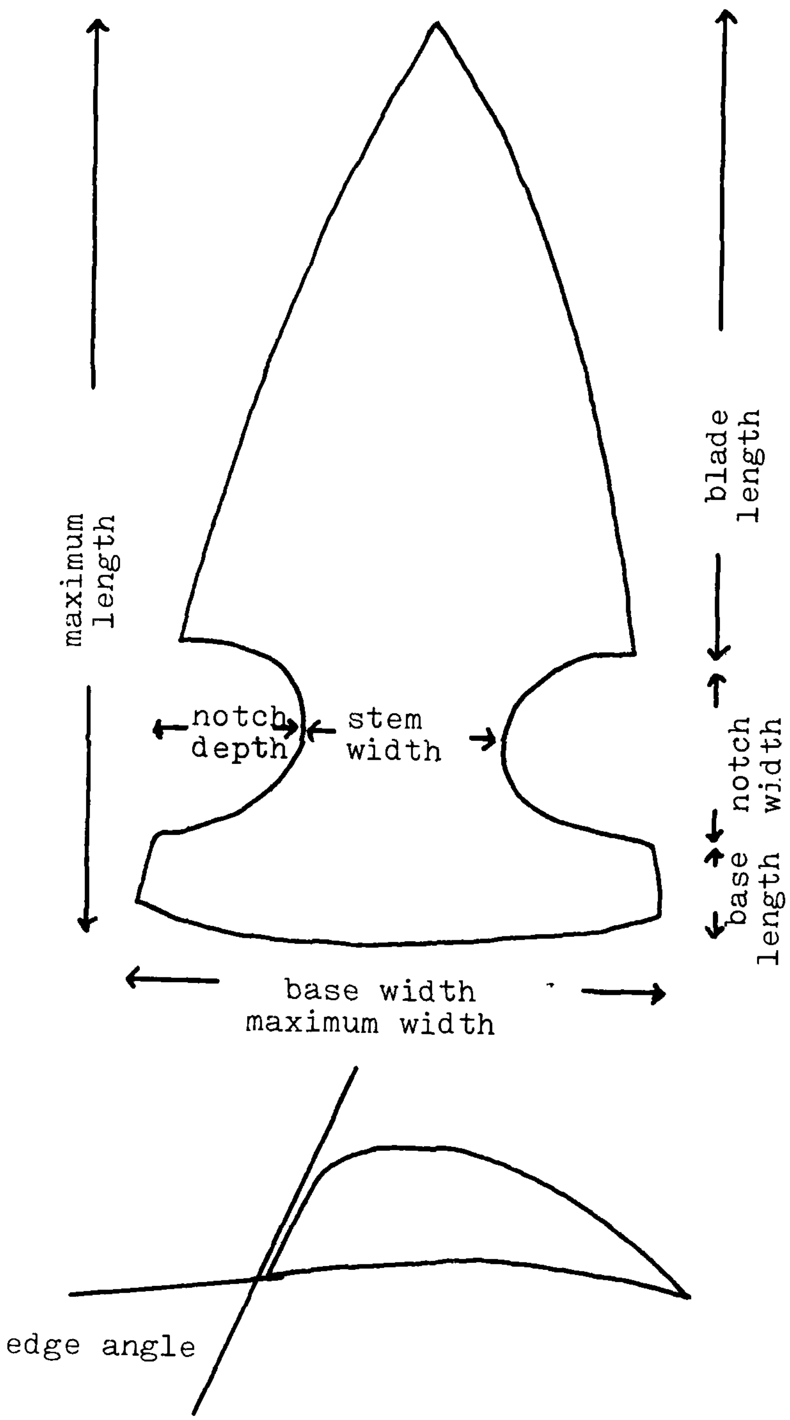


Figure 104. Attribute measurements on chipped stone tools.

Potential errors: Flakes are usually easily recognized.
Cultural-historical position: Flakes are associated with all prehistoric complexes in Nebraska.
Research value: The presence of a large number of flakes at a site would indicate the location of extensive tool manufacture. The presence of potlids suggests the possible preheating of stone prior to its modification into tools.

RETOUCHED FLAKES
Definition: A flake that has either a combination of marginal or invasive retouch along one or more of its lateral edges or ends. Angles of the retouched/used edge are approximately 60 degrees.
Potential errors: Retouched flakes may be confused with flakes that have been damaged by recent activities at their site, such as modern agricultural practices or archaeological excavation, or flakes that were utilized by their manufacturer but were not retouched.
Cultural-historical position: Retouched flakes are associated with all prehistoric complexes in Nebraska.
Research value: The presence of a large number of retouched flakes may indicate the maximum use of available raw materials and/or manufacture of expedient tools for performing single tasks.

SHARPENING FLAKES
Definition: Two types of sharpening flakes are recognized: (1) sharpening flakes from bifacially flaked tools and (2) sharpening flakes from unifacially flaked tools. Sharpening flakes are characterized by having a well-defined working edge along their proximal end. The former working edge of the tool was used as the platform for removal of the resharpening flake (Frison 1968).
Potential errors: Sharpening flakes may be confused with retouched flakes.
Cultural-historical position: Sharpening flakes are associated with all prehistoric complexes in Nebraska.
Research value: Examination of the former working edges on sharpening flakes can yield information about the types of tools being used (i.e., bifacially or unifacially flaked tools) and microscopic examination of the former working edges can yield information about the types of materials on which the stone tools were being used.

CHUNKS/SHATTER
Definition: Any piece of chert, flint or raw material that is cubical or irregularly shaped and lacks any well defined pattern of negative or positive bulbs of force, striking platforms, or systematic alignment of cleavage scars on the various faces (Binford and Quimby 1963).
Potential errors: Chunks/shatter may be confused with cores.

Cultural-historical position: Chunks/shatter are associated with all prehistoric complexes in Nebraska.
Research value: The presence of a large number of chunks/shatter would indicate the testing of raw materials that may be associated with extensive stone tool manufacturing.

CORES
Definition: Any piece of raw material that has a recognizable striking platform and has well-defined flake scars (negative bulbs of force) and systematic alignment of cleavage scars on the various faces. Cores can be further divided into block cores and blade cores. Block cores are used in the production of irregularly shaped flakes while blade cores are used in the production of regularly shaped blades or flakes.
Potential errors: Cores may be confused with chunks/shatter.
Cultural-historical position: Block cores are associated with all prehistoric complexes in Nebraska while blade cores are most frequently associated with the Plains Woodland and more recent cultural complexes.
Research value: The potential of cores for production of flakes and blades is sometimes not exhausted and therefore the presence of cores may represent the storage of raw material (House 1975:65).

KNIVES
Definition: A tool that has marginal and/or invasive retouch on one or both faces. There is a well-defined working edge and/or areas of utilization. Retouch is produced by percussion and pressure flaking techniques. Knives occur in a variety of geometric forms, the most common being rectangular and sub-triangular. They are usually biconvex to trapezoidal in cross-section with two lateral cutting edges. Large and broken projectile points were often recycled and used as hafted knives. The angle of the use edge is approximately 40 to 50 degrees with edge wear consisting of crushing and step faceting.
Potential errors: Triangular, notched knives are often confused with projectile points. One method to distinguish between hafted knives and projectile points is to determine the sharpness of the tip and the edge characteristics of the blade. Projectile points, in order to be successfully employed in procurement activities, must have a sharp point or tip. Knives generally have blunted tips.
Cultural-historical position: Knives are associated with all prehistoric cultural complexes in Nebraska. Particular knife forms have specific names and some have restricted temporal occurrence.

Harahey knife: This is a diamond-shaped knife with four alternately beveled working edges. This knife form is commonly associated with cultures during the Plains Village period.

Cody knife: The Cody knife is a diagnostic artifact that dates from 8,000 to 5,000 B.C. It is an asymmetrical, stemmed implement with a transverse blade. It is usually shouldered on one side, sometimes on both, and on occasion the stem is parallel-sided without shoulders (Wormington 1957:128, 267; Irwin and Wormington 1970:29). The stem may be oriented to as much as a 46 degree angle from the cutting edge (Agenbroad 1978:161).

Badlands knife: This type of knife is made from elongate and irregularly-shaped chalcedony plates. A single edge, or the adjacent edges, are bifacially worked, forming a cutting edge. One edge is blunted or worn smooth. This serves as the handle. Tool faces, other than edges, are usually unaltered. This knife has a wide distribution throughout the western Plains.

Miscellaneous stemmed knives: Blade edges vary from straight to slightly convex. Bases are straight or convex. They may be side notched or corner notched.

Miscellaneous unstemmed knives: This group of knives includes a variety of symmetrical and asymmetrical forms. They may be ovate, lanceolate, triangular, or rectangular in outline. Edges and bases range from nearly straight to convex. Edges are bifacially worked but faces may be unaltered.

Research value: Knives are indicative of cutting tasks.

CHOPPERS

Definition: A tool that has marginal and/or invasive retouch on one or both faces of the stone. There is usually a restricted working edge and/or areas of utilization. Retouch is usually by percussion flaking techniques. Choppers are large tools that are grasped by one or both hands. They usually have a convex to pointed working edge. Used working edges usually exhibit battering and crushing.
Potential errors: Recognition of choppers is usually easy.
Cultural-historical position: Choppers are associated with all prehistoric complexes in Nebraska.
Research value: Choppers were probably used in the initial butchering of animals and smashing of large bones in marrow extraction.

END SCRAPERS

Definition: A flake that has been marginally or invasively retouched on one face to produce a regularly shaped straight-to-convex working edge on one end that is usually transverse to the axis of force. The angle of the use edge is approximately 75 degrees. Edge wear, if present, usually consists of crushing and/or rounding.

Potential errors: End scrapers may be confused with retouched flakes.

Cultural-historical position: End scrapers are associated with all prehistoric cultural complexes in Nebraska. Large, plano-convex scrapers with invasive retouch on one face are usually associated with earlier cultural complexes, before 1,000 B.C., while smaller, marginally retouched scrapers tend to be associated with later cultural complexes dating more recent that 1,000 B.C.

Research value: End scrapers are probably specialized tools used in hide preparation and the working of wood and bone.

SIDE SCRAPERS

Definition: A flake or other blank with marginal or invasive retouch on one face to produce a regularly shaped straight-to-convex working edge on either one or both lateral sides. Retouch is usually parallel to the axis of force on the flake blank. The angle of the use edge is approximately 75 degrees. Edge wear, if present, usually consists of crushing and/or rounding.

Potential errors: These may be confused with retouched flakes.

Cultural-historical position: Side scrapers are associated with most prehistoric cultural complexes in Nebraska.

Research value: Side scrapers were probably used in hide preparation and the working of bone and wood.

DISTO-LATERAL SCRAPERS

Definition: A flake or other blank type with marginal and/or invasive retouch on one face to produce a regularly shaped straight-to-convex worked edge on one or both lateral edges and one of the ends. Retouch is usually both parallel and perpendicular to the axis of force on the flake blank. The angle of the use edge is approximately 75 degrees.

Potential errors: Disto-lateral scrapers may be confused with retouched flakes.

Cultural-historical position: These are associated with most prehistoric cultural complexes in Nebraska.

Research value: Disto-lateral scrapers probably represent specialized tools used in hide preparation and working wood and bone.

DRILLS

Definition: A flake or other tool blank with marginal or invasive retouch to produce a pronounced (often rounded) protrusion or bit on the end of the blank. Projectile points are sometimes worked into drills. The bits are long, narrow and usually biconvex or trapezoidal in cross-section.
Potential errors: Drills are usually easy to recognize.
Cultural-historical position: Drills are associated with most prehistoric cultural complexes in Nebraska.
Research value: Drills are believed to have been used in the drilling of holes in wood, bone and shell for the manufacture of tools and ornaments.

GRAVERS

Definition: A flake or other blank form with marginal or invasive retouch to produce a pronounced, sharp, angular projection on the tool.
Potential errors: Gravers are usually easy to recognize.
Cultural-historical position: Gravers are associated with all prehistoric cultural complexes in Nebraska.
Research value: Gravers are believed to have been specialized tools used for engraving and incising wood and bone.

NOTCHES (SPOKESHAVES)

Definition: A tool with marginal retouch to produce a single, concave notch along the edge of the blank form. The notch usually forms a half-circle on the tool's edge.
Potential errors: Notches are usually easily recognized.
Cultural-historical position: These are associated with all prehistoric cultural complexes in Nebraska. Tools with wide notches tend to be associated with cultural complexes dating earlier than A.D. 500 while tools with narrow notches tend to be associatied with cultural complexes dating later than A.D. 500.
Research value: Notches are believed to be specialized tools used in the manufacture of wood and bone shafts.

DENTICULATES

Definition: A tool with marginal retouch to produce two or more contiguous notches along any working edge. Retouch may be discontinous. The notched working edge has the characteristic of a saw blade.
Potential errors: These are usually easily recognized.
Cultural-historical position: Denticultes are associated with all prehistoric cultural complexes in Nebraska.
Research value: These are probably specialized tools used for the procurement of plant foods and/or general tasks such as modifying wood and bone.

PREFORMS

Definition: A flake, chunk/shatter or core that has marginal and/or invasive retouch on one or both faces to produce a symmetrically shaped artifact. Well defined working edges or areas of utilization are lacking. Preforms are usually manufactured by direct percussion techniques and are one of the first stages in the manufacture of chipped stone tools. Preforms are unfinished tools and require additional modification to achieve finished form.

Potential errors: Preforms may be confused with finished tools.

Cultural-historical position: Preforms are associated with all prehistoric cultural complexes in Nebraska.

Research value: Preforms may represent unfinished tools that may help elucidate manufacturing methods and lithic procurement patterns.

TESTED MATERIAL

Definition: A piece of stone that has one or only a few irregularly placed flake scars. Tested material does not have any regular shape nor systematically placed flake scars. It is the initial checking of stone to determine whether it is suitable for the manufacture of tools or ornaments.

Potential errors: Tested material may be confused with cores.

Cultural-historical position: Tested material are associated with all prehistoric cultural complexes in Nebraska.

Research value: The presence of tested material suggests the procurement of stone for the manufacture of tools.

PROJECTILE POINTS

Definition: A tool that is triangular in shape and that has marginal and/or invasive retouch on both faces. Projectile points have well defined blades and hafting elements. Hafting elements may consist of flutes, stems, corner notches, side notches, basal notches or a combination of the above. Hafting elements may be more subtle on small triangular points that do not have obvious stems or notches. In these cases hafting elements frequently have rounded or blunted edges where the points were attached to the shaft. Angles of the blade edge are approximately 40 to 50 degrees. Edge wear is usually difficult to discern.

Potential errors: Larger projectile points may be confused with knives.

Cultural-historical position: There are a wide variety of projectile point forms with many having defined temporal and spacial occurrence. The earliest known projectile point type is the Clovis point that dates to approximately 10,000 B.C. The earliest arrow points, which are very small in relation to spear and dart points, first occur at approximately A.D. 500.

Research value: Projectile points can be useful temporal and cultural indicators. The presence of projectile points suggests hunting activities.

ABRADERS

Definition: Any piece of abrasive stone with a smooth, flat or grooved working surface. Sandstone is the most common raw material for making abraders. Abraders may be either flat, for the sharpening of other tools, or have a groove, which is believed to have been used to smooth and sharpen other tools. Grooved abraders are often referred to as shaft straighteners.
Potential errors: The wear may be difficult to distinguish on weathered specimens. Recent plow marks may be mistaken for small grooves.
Cultural-historical position: Abraders may be associated with all prehistoric cultural complexes in Nebraska. Grooved abraders tend to occur more frequently since 1,000 B.C.
Research value: The presence of abraders suggests the manufacture and/or sharpening of other tools.

In order to obtain information concerning the possible function of modified chipped stone tools, working edges were examined at 30X to 45X with a Bausch and Lomb binocular microscope. Angles of the working/retouched edges of retouched tools were measured with a goniometer and five types of use-wear were recognized during analyses. These are defined below.

RETOUCHED EDGE ANGLES

Definition: Retouched edge angles were measured to the nearest 5 degrees with a goniometer. For flaked tools edge angle is the angle between the ventral (unretouched face of the tool) and dorsal faces of the working/use edge of the tool where the tool faces merge (Fig. 104).
Potential errors: Edge angles are easily measured with a goniometer.
Research value: Wilmsen (1968a, 1968b, 1970) has inferred that cutting operations are performed best with tools having acute edge angles between 26 to 35 degrees. Edge angles between 46 and 55 degrees are suitable for a number of functional applications. These could be used for skinning and hide preparation, plant-fiber shredding, cutting bone or horn or maybe tool back-blunting. Steeper angles of 66 to 75 degrees are best suited for wood and bone working, skin softening and heavy shredding.

NO WEAR

Definition: This is the absence of any discernible wear on a tool's working edge.

Potential errors: The absence of discernible wear may be due to low magnification of the microscope.
Research value: The absence of wear suggests one of the following: (1) the tool was not used long enough to produce discernible wear at 45X; (2) the tool was used but was sharpened immediately prior to its discard; or (3) the tool was not used after its manufacture.

EDGE ROUNDING
Definition: Edge rounding consists of edge abrasion resulting in a smoothed or polished surface. The more prominent areas along a working edge are most likely to be smoothed. Edge rounding has been recognized, replicated and described in a number of studies (Ahler 1970; Semenov 1964; Keeley and Newcomer 1977).
Potential errors: This is easily recognized but artifacts recovered from river and/or lake beaches may exhibit this wear due to weathering.
Research value: Edge rounding is the result of working soft and medium hard materials such as hides, meat and green wood.

EDGE CRUSHING
Definition: Edge crushing consists of edge abrasion resulting in an irregular, angular and fractured edge with compound, minute scalar flake scars. Crushing is often associated with edge rounding. This form of wear has been identified, replicated and described in a number of studies (Semenov 1964; Ahler 1970; Keeley and Newcomer 1977; Hester, Spencer, Busby and Bard 1976; Tringham et al. 1974; Keller 1966).
Potential errors: This may be confused with step-flaking. Edge crushing may be due to edge grinding for the preparation of flake removal in tool manufacture.
Research value: Crushing is the result of working medium hard and hard materials such as green wood and bone.

STEP FLAKING
Definition: Step flaking is characterized by flake scars that are wider than they are long and that terminate in a stepped fracture. These step flakes are often compounded, one overlapping the next. Step flaking has been recognized, recorded and described in a number of studies (Semenov 1964; Ahler 1970; Keeley and Newcomer 1977; Tringham et al. 1974; Keller 1966).
Potential errors: Extensive step flaking may be confused with edge crushing. The presence of some step flaking may be a result of edge modification.
Research value: Step flaking is the result of working hard materials, such as dry wood and bone.

FRACTURES

Definition: Fractures are longitudinal, transverse and diagonal breaks on tools.

Potential errors: Fractures are easy to recognize.

Research value: Fractures may be the result of several forms of use or abuse: (1) breakage during manufacture (Lenoir 1975); (2) heat fracture (Purdy 1971; 1974; 1975; Crabtree and Butler 1964; Mandeville and Flenniken 1974; Collins and Fenwick 1974; Hester and Collins 1974; Hester 1972; 1973; Shippee 1963); (3) direct impact fracture (Purdy 1975:34-35; Tsirk 1979:84); and, (4) impact fracture associated with projectile points that have hit hard materials (Ahler 1970:85-86).

Analyses

The following are analyses of the unmodified and modified chipped stone artifacts recovered from investigations at the sites in this study. Because of the low frequency of chipped stone artifacts from some of the sites more precise interpretations cannot be made due to small sample sizes. Interpretations in this study are for flake samples of 10 or greater. Summaries regarding shatter where sample sizes are less than 10 are included because of larger flake assemblages. The low frequency of formal chipped stone tools (e.g., projectile points, scrapers, knives, etc.) does not permit detailed generalizations to be made. The low frequency of ground stone artifacts does not allow more sophisticated analyses other than their identification and probable function. Analyses began with sorting sites with artifact sample sizes of 10 or greater for specific artifact types (e.g., flakes, shatter) (Appendix A). This permits generalizations to be made regarding certain behaviors practiced by different prehistoric cultures.

Figures 105 through 128 summarize information for flakes and shatter that were excavated and recovered from surface grab collections. Figures 129 through 135 and Tables 81 through 83 summarize information for formal tool types (e.g., projectile points, knives, scrapers, retouched flakes) recovered from both surface survey and excavation. Data used to construct the figures are in Appendix A.

Results of analyses for excavated flakes (Figs. 105 and 106) indicate all of the sites examined have similar flake lengths, widths and thicknesses with the exception of site 25HN57 which has slightly smaller flakes and site 25HN33 which has slightly larger flakes. With the exception of the above two sites, the mean average flake length is approximately 12 mm to 15 mm, flake width is approximately

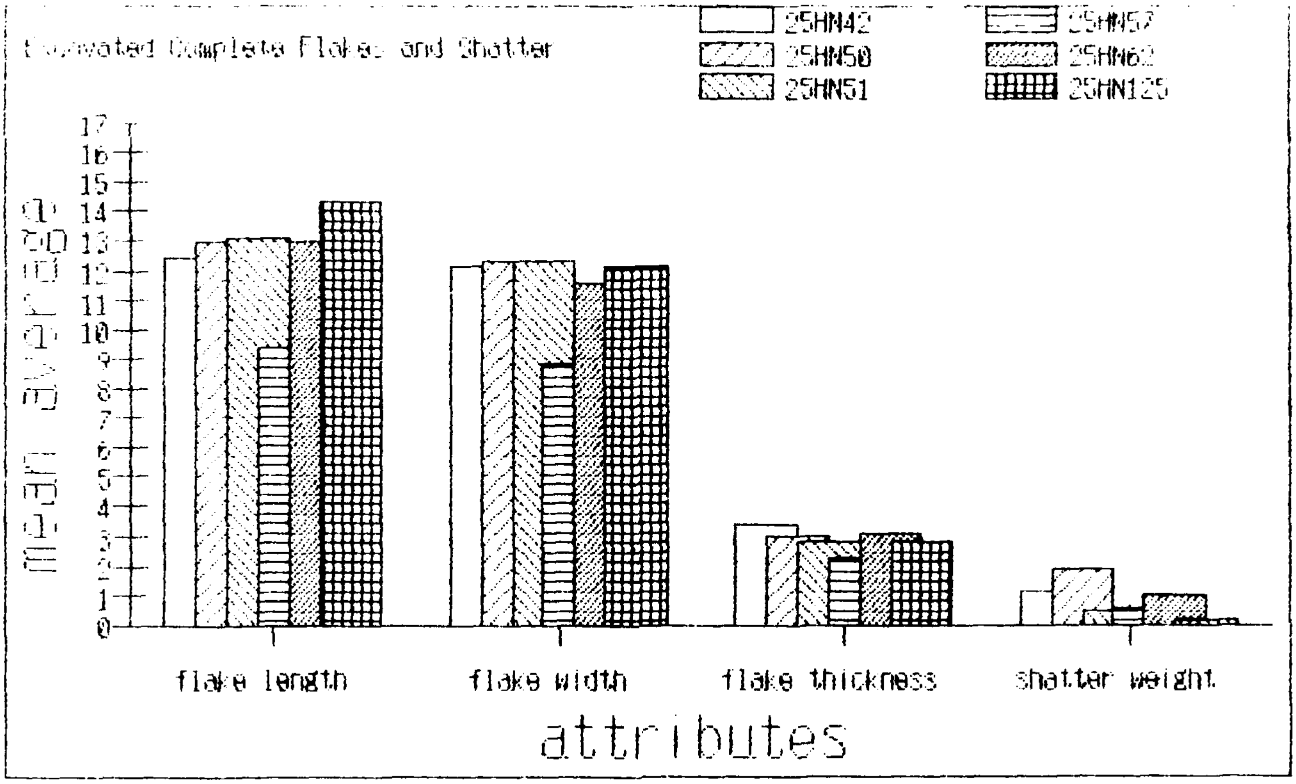


Figure 105. Mean length, width and thickness of excavated flakes and mean weight of excavated shatter from 25HN5, 25HN6, 25HN31, 25HN33, 25HN36, 25HN37, 25HN39, and 25HN40.

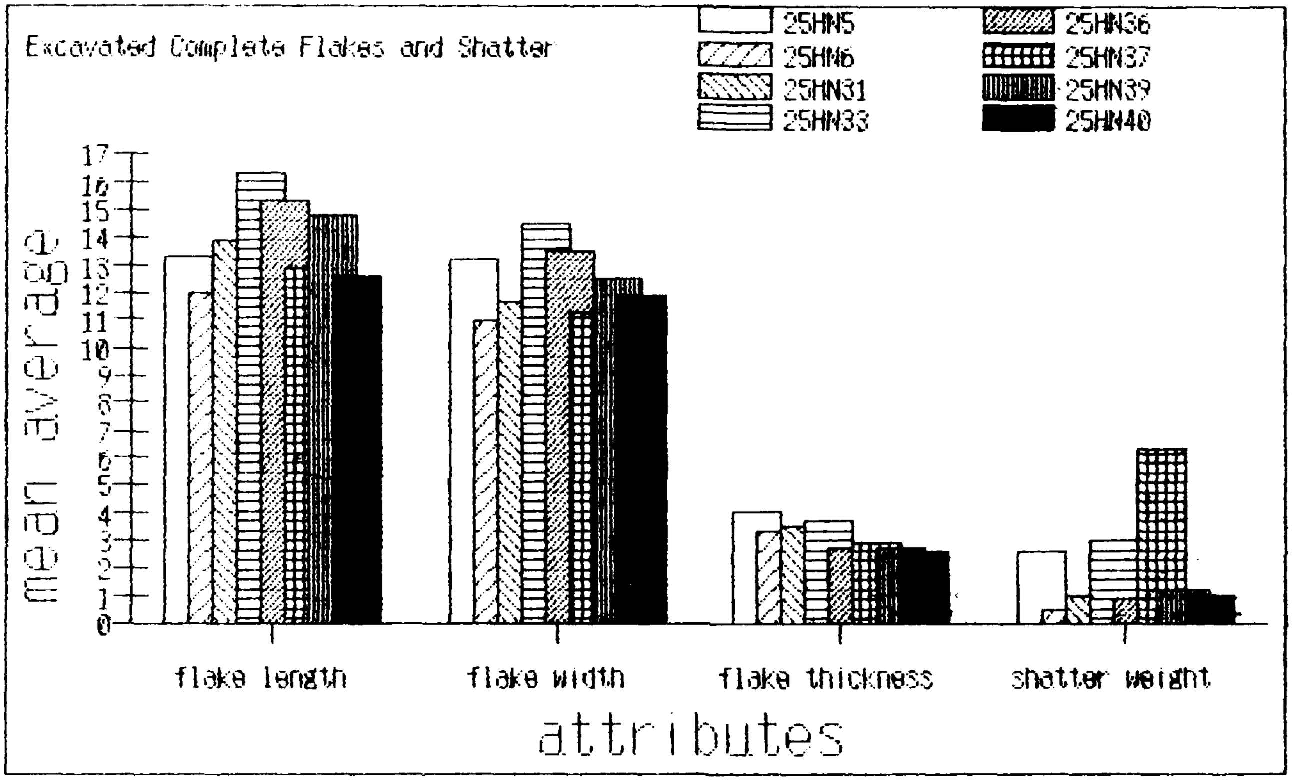


Figure 106. Mean length, width and thickness of excavated flakes and mean weight of excavated shatter from 25HN42, 25HN50, 25HN51, 25HN57, 25HN62, and 25HN125.

12 mm to 15 mm and flake thickness is approximately 3 mm to 4 mm. Results indicate flakes are short, wide and thin. This is also true for site 25HN33, which has slightly larger flakes and site 25HN57 which has slightly smaller flakes. There are few flakes from any of the sites that are greater than 30 mm in maximum length or width. With the exception of having greater variability between specific sites, sizes for flakes recovered from the surface (Fig. 107) are similar to the results for excavated flakes.

The standard deviation is a measure of how observations are clustered around a central value. A high standard deviation indicates values are not clustered around the mean (average) while a low standard deviation indicates values are clustered around the mean (Davis 1973:66). Figures 108 and 109 show standard deviations for flake length, width and thickness for excavated specimens.

For flake length, sites 25HN31, 25HN33, 25HN36 and 25HN39 have standard deviations of approximately 7.5 to 8.0 while sites 25HN5, 25HN40, 25HN42, 25HN50, 25HN51, 25HN62 and 25HN125 have standard deviations of approximately 4.5 to 6.0. Sites 25HN6, 25HN37 and 25HN57 have standard deviations of approximately 2.5 to 4.0. For flake width, sites 25HN5, 25HN6, 25HN31, 25HN33, 25HN36, 25HN39 and 25HN50 have standard deviations of approximately 5.0 to 7.0 while sites 25HN37, 25HN40, 25HN42, 25HN51, 25HN57, 25HN62 and 25HN125 have standard deviations of approximately 3.0 to 4.5. For flake thickness, sites 25HN5, 25HN31 and 25HN33 have standard deviations of approximately 3.0 while the other sites have standard deviations of approximately 1.0 to 2.0. The implications of these results are not readily apparent. Flakes recovered from excavations at sites 25HN6, 25HN37, 25HN40 and 25HN57 have a substantially lower standard deviation in size with respect to the other sites. One possible interpretation is that flakes at these four sites were being made for a specific purpose that required them to be more uniform in size.

Similar patterns are observable for flakes recovered from the surface (Fig. 110). For flake length, site 25HN38 has a standard deviation of approximately 18.0 while sites 25HN12, 25HN37 and 25HN40 have standard deviations of approximately 10.0. Sites 25HN16, 25HN54 and 25HN62 have standard deviations of approximately 5.0. Because these are surface specimens, however, recovery bias may be a factor.

Figures 105 and 106 show mean shatter weight for 14 sites. Four sites, 25HN6, 25HN33, 25HN37 and 25HN125, have sample sizes less than 10. Examination of the figures indicate sites 25HN5 and 25HN50 have larger pieces of shatter than the other sites. Figure 107 shows mean shatter weight for surface collections from seven sites. Two of the seven sites, 25HN12 and 25HN16, have sample sizes of less than 10. Examination of Figure 107 shows sites 25HN12 and 25HN37 have very large pieces of shatter while the other sites have substantially smaller pieces. The large pieces of shatter from 25HN12 and 25HN37 may reflect storage of available raw material for future flint knapping. Both sites are believed to represent more permanent villages, and therefore, the need may exist for storing raw material for the manufacture of stone tools.

Figures 108 and 109 show standard deviations for shatter weight for 14 sites. Four sites, 25HN6, 25HN33, 25HN37, and 25HN125 have sample sizes less than 10. Examination of Figures 108 and 109 show sites 25HN5, 25HN37, 25HN40, 25HN42, 25HN50 and 25HN62 have large standard deviations indicating there are a few very large and small pieces of shatter recovered from them. Figure 110 shows standard deviations for shatter weight for seven sites with surface collections. Two sites, 25HN12 and 25HN16, have sample sizes of less than 10. Examination of Figure 110 shows sites 25HN12 and 25HN37 have very large standard deviations indicating several large and small pieces of shatter were recovered from their surfaces. The presence of large pieces of shatter or raw material for the manufacture of chipped stone artifacts can be viewed as a repository of raw material for tool manufacture. This is probably the case at the above sites with large pieces of shatter present. The presence of small shatter is probably the result of the manufacture of chipped stone artifacts.

Figures 111, 112, and 113 show the frequency of flake types (i.e., primary, secondary, interior) from excavations and Figures 114 and 115 show the frequency of flake types from surface collections. In all cases total flake counts for each site were 10 or greater. Figures 111, 112, and 113 show a relatively low frequency for primary and secondary flakes from all sites. There are a few inter-site differences. Site 25HN5, 25HN42 and 25HN62 have slightly higher relative frequencies of primary and secondary flakes. This indicates initial chipped stone tool manufacturing was occurring more frequently at these three sites in contrast to the other sites. Most chipped stone tool manufacturing involved either final manufacure of stone tools (i.e., primary knapping occurred elsewhere probably at the source of the raw material for making stone tools), or the sharpering of tools. This accounts for the large frequency

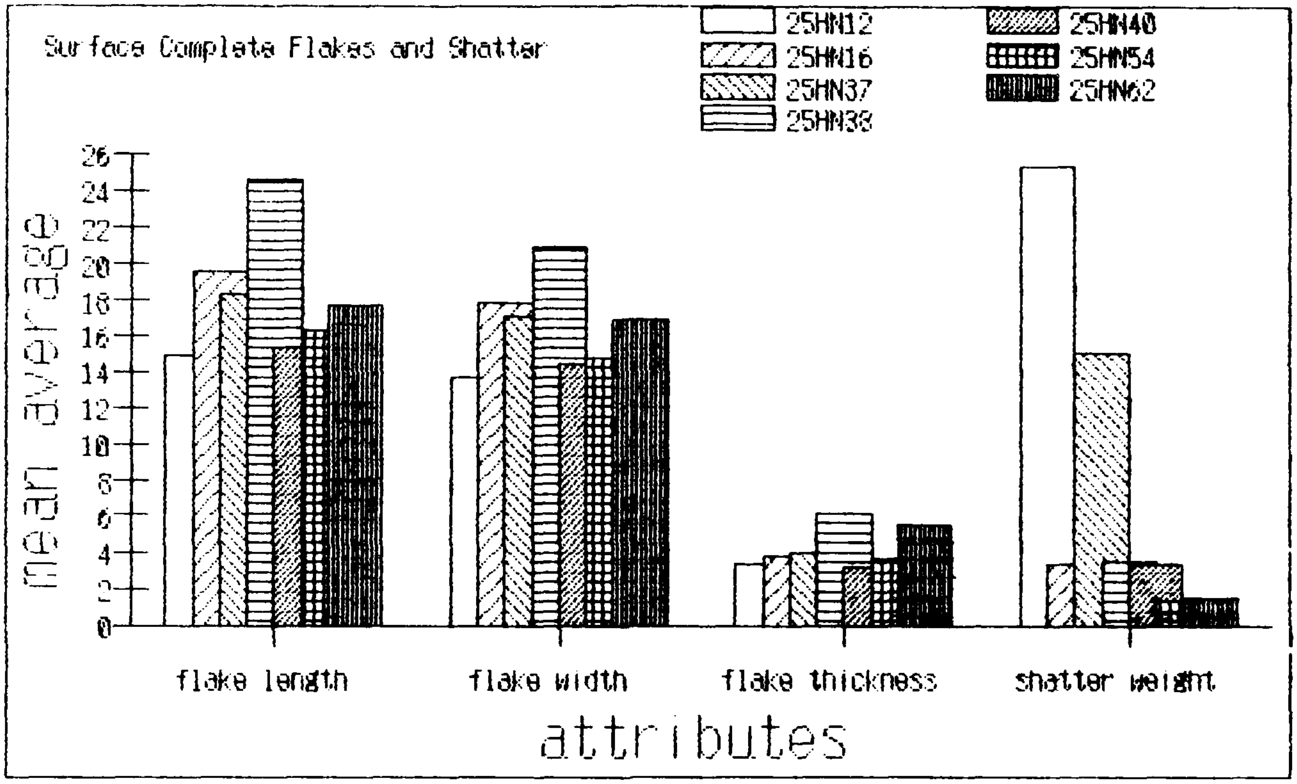


Figure 107. Mean length, width-and thickness of surface flakes and mean weight of surface shatter from 25HN12, 25HN16, 25HN37, 25HN38, 25HN40, 25HN54, and 25HN62.

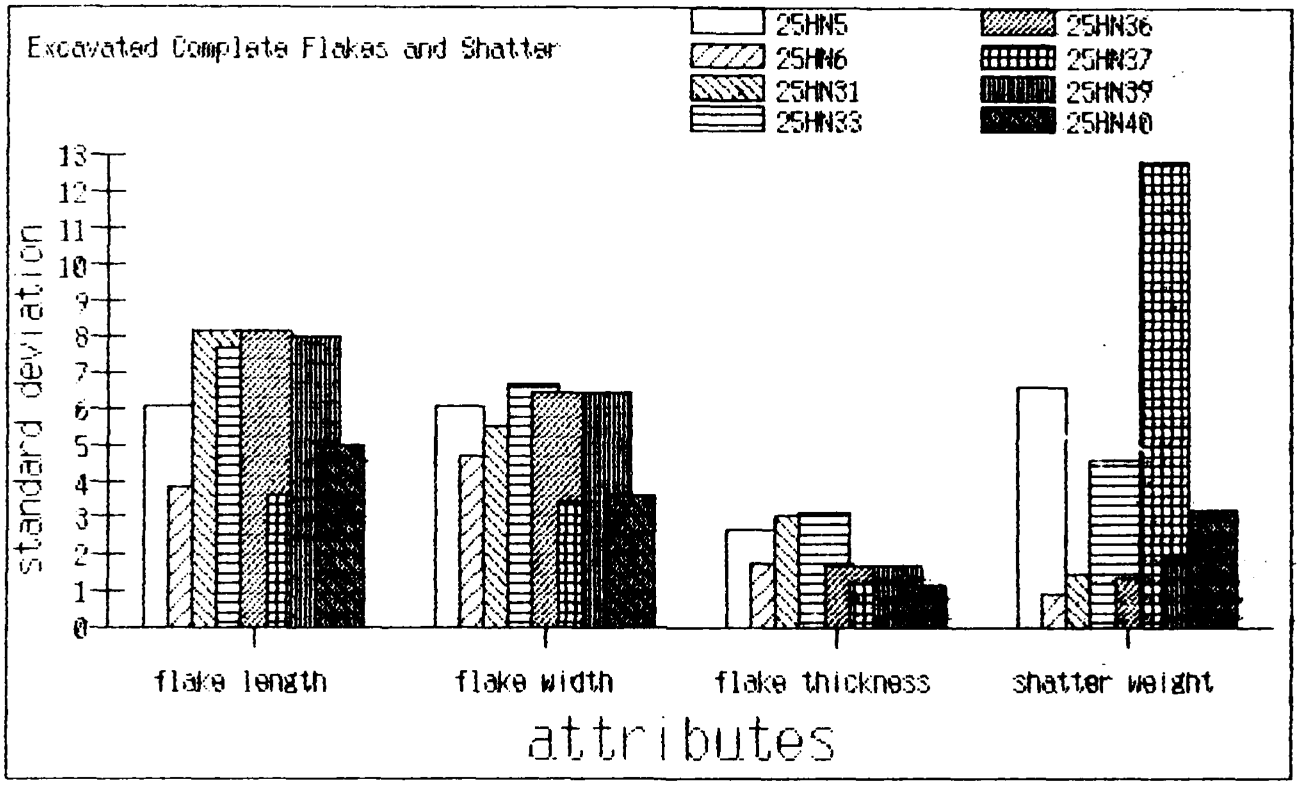


Figure 108. Standard deviation of length, width and thickness for excavated flakes and weight for excavated shatter from 25HN5, 25HN6, 25HN31, 25HN33, 25HN36, 25HN37, 25HN39, and 25HN40.

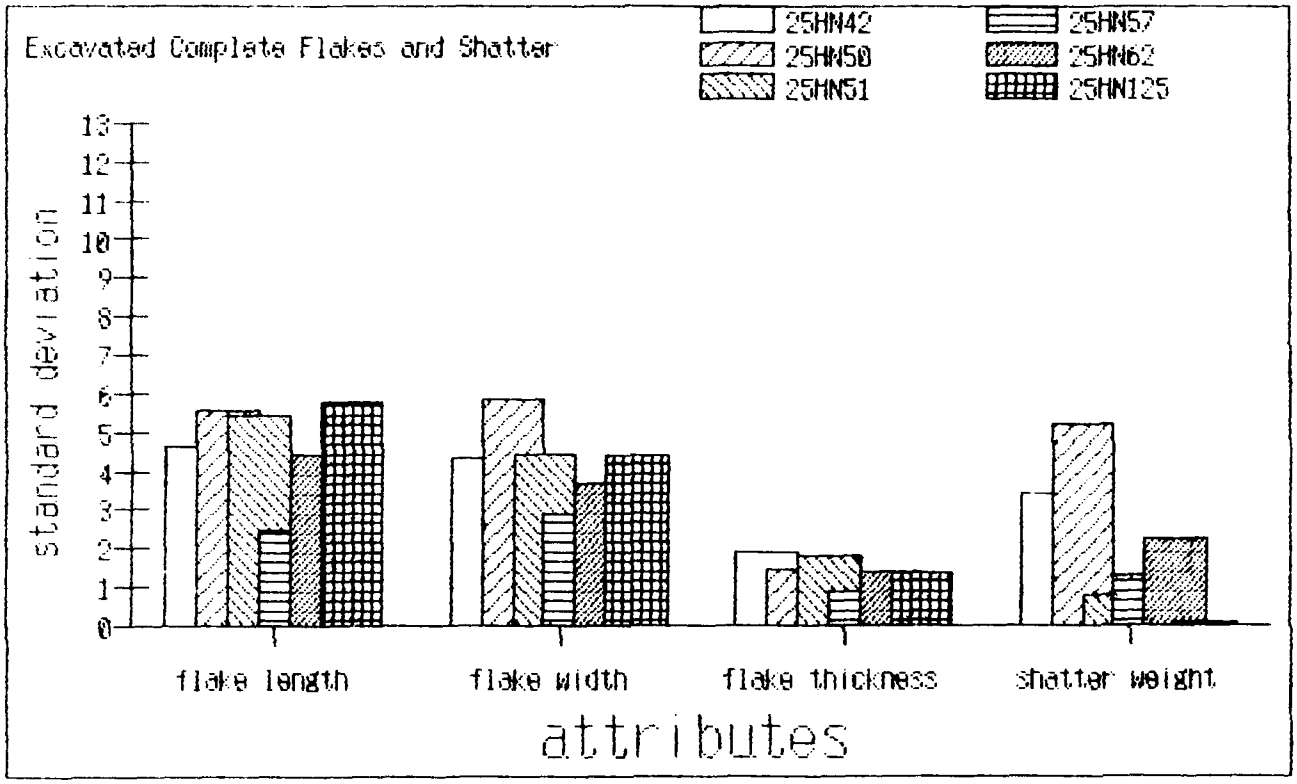


Figure 109. Standard deviation of length, width and thickness for excavated flakes and weight for excavated shatter from 25HN42, 25HN50, 25HN51, 25HN57, 25HN62, and 25HN125.

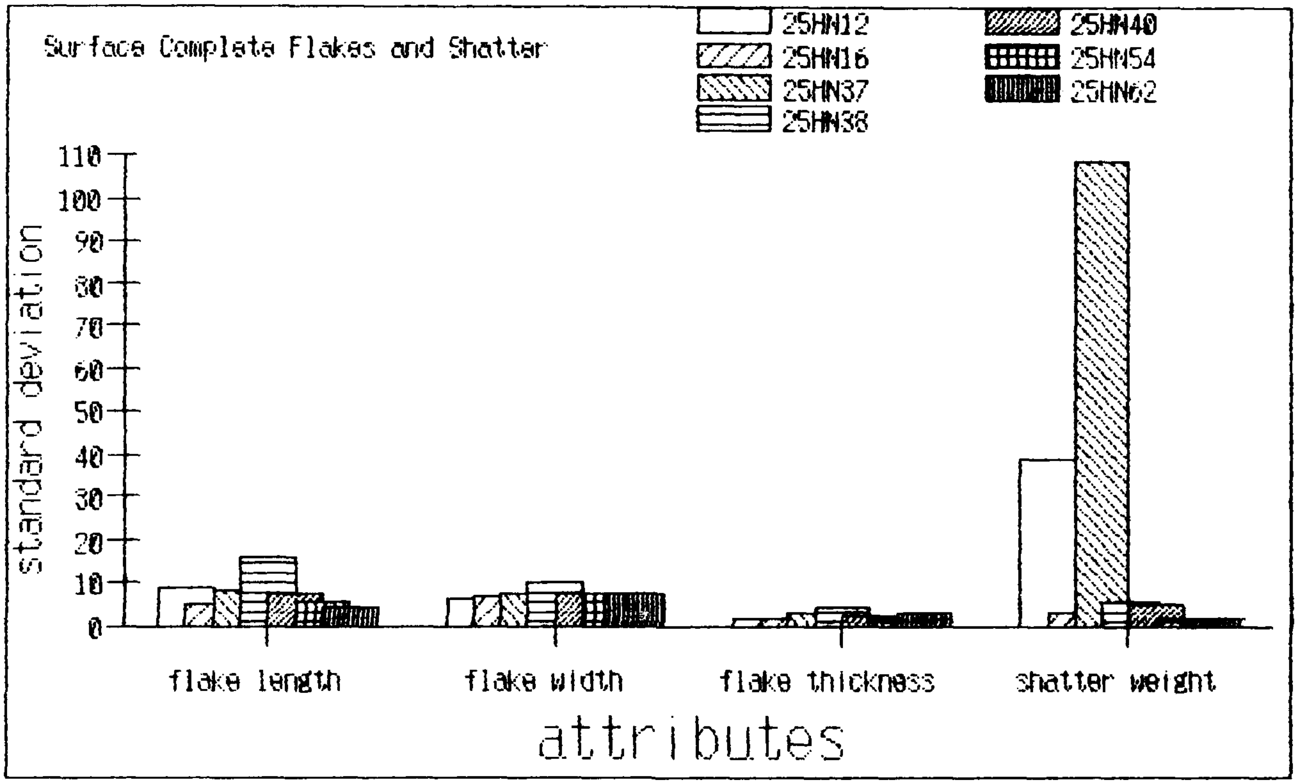


Figure 110. Standard deviation of length, width and thickness for surface flakes and weight for surface shatter from 25HN12, 25HN16, 25HN37, 25HN38, 25HN40, 25HN54, and 25HN62.

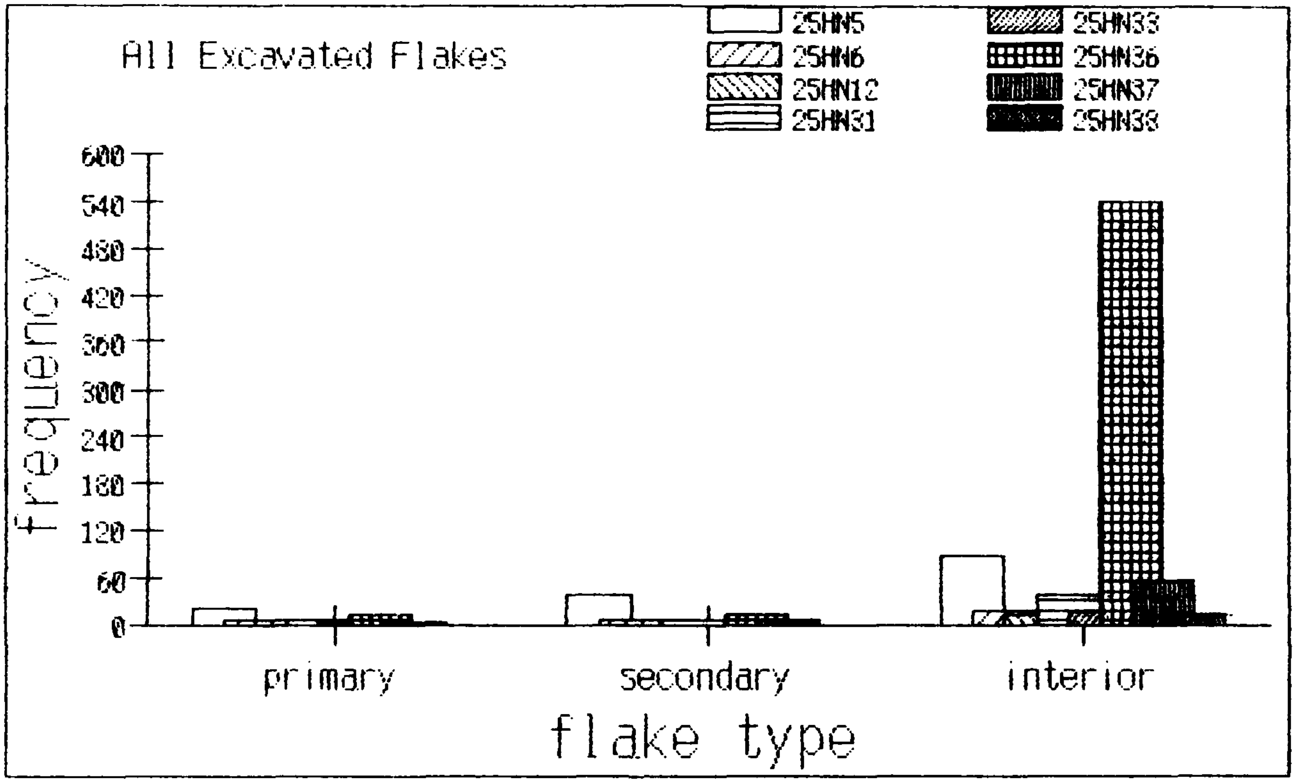


Figure 111. Frequency for excavated flake type, 25HN5, 25HN6, 25HN12, 25HN31, 25HN33, 25HN36, 25HN37, and 25HN38.

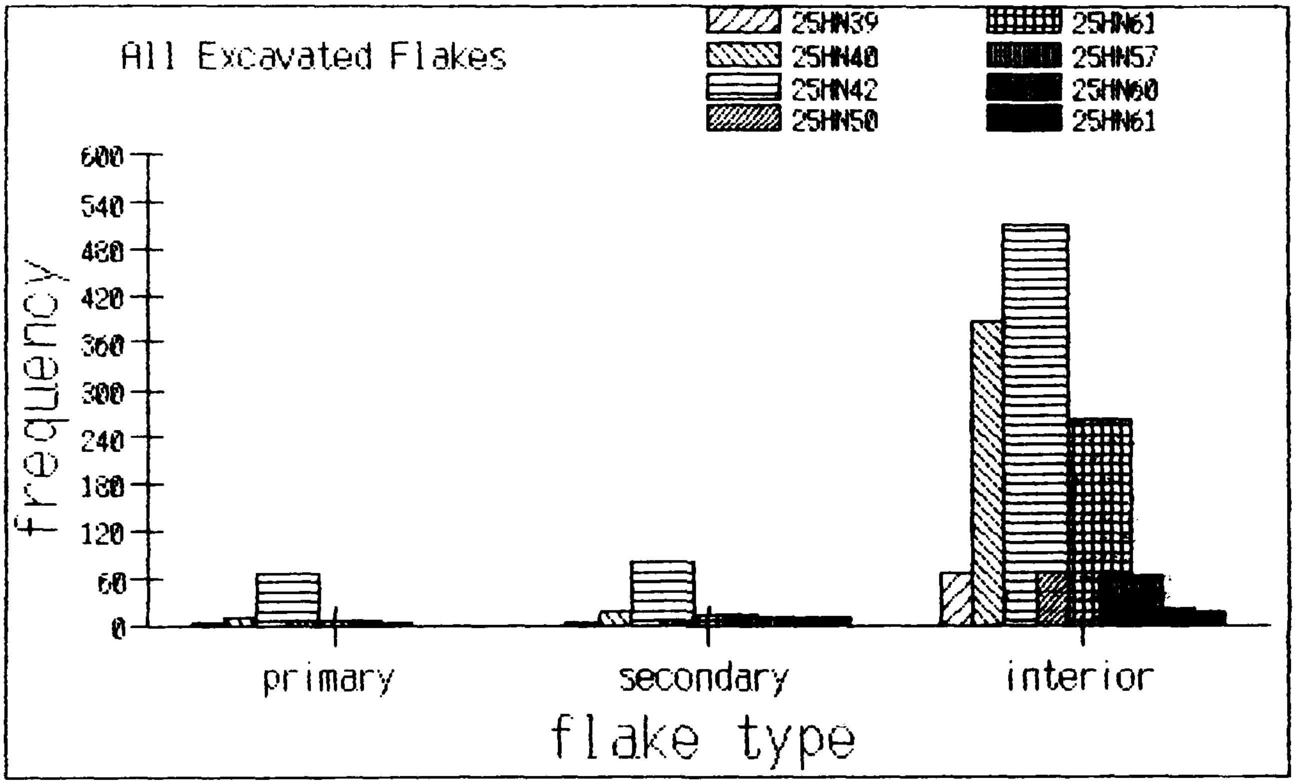


Figure 112. Frequency for excavated flake type, 25HN39, 25HN40, 25HN42, 25HN50, 25HN61, 25HN57, 25HN60, and 25HN61.

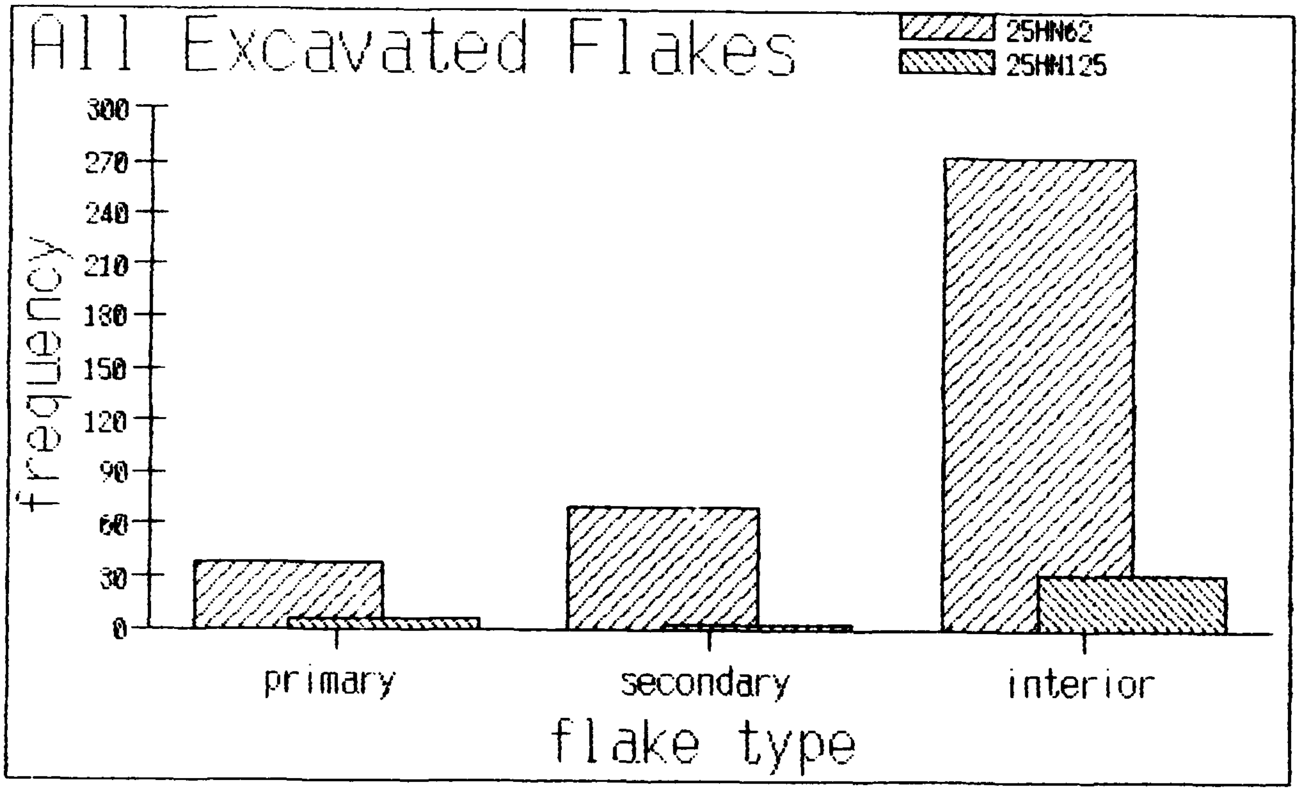


Figure 113. Frequency for excavated flake type, 25HN62 and 25HN125.

of interior flakes as opposed to flakes with cortex. There is no evidence to indicate that any of the sites studied during this project are either quarries or localities where primary chipped stone tool manufacture occurred. Similar conclusions are made regarding flakes recovered from the surface (Figs. 114 and 115).

Figures 116, 117, and 118 show the frequency of flake parts (i.e., complete, proximal, medial, distal) from excavations and Figures 119 and 120 show the frequency of flake parts from surface collections. Several general trends are observable. Complete flakes tend to be most frequent while proximal, medial and distal fragments tend to occur in similar frequency. There are a few inter-site differences. Sites 25HN5 and 25HN36 have relatively more medial than proximal or distal fragments. An explanation for this difference is not readily apparent since 25HN5 is an Upper Republican ossuary and 25HN37 is a Dismal River village. Flake parts recovered from the surface (Figures 119 and 120) tend to occur in relatively similar frequencies with the exception of site 25HN37 which has relatively more complete flakes. Results suggest surface collections tend to consist of more incomplete flakes probably due to breakage from being exposed on the ground surface for extended periods of time. The relatively equal frequency of proximal, medial and distal flake fragments from excavations is what one might expect for breakage patterns.

Figures 121, 122, and 123 show the frequency of heated and non-heated excavated flakes and Figures 124 and 125 show the frequency of heated and non-heated surface flakes. Figures 126 and 127 show the frequency of heated and non-heated excavated shatter and Figure 128 shows the frequency of heated and non-heated surface shatter. Figures 121 and 122 show few excavated flakes have evidence of being heated. Similar results apply to surface flakes (Figs. 124 and 125), excavated shatter (Figs. 126 and 127) and surface shatter (Fig. 128). These results indicate intentional and/or unintentional heating of chert was not widely practiced by any of the prehistoric and/or historic cultures represented by the sites in this study. The presence of heated chert and potlids (Appendix A), however, indicates heat treating chert was extensively, but not intensively, practiced.

Figures 129, 130, 131, 132 and Table 81 show results of summary statistics (mean and standard deviation) for the length, width, thickness and edge angle of chipped stone tools (e.g., projectile points, knives, scrapers and retouched flakes). Other tool types are not included because of small sample sizes. Figure 129 shows comparisons in length for the above tool types. Projectile points have the lowest standard deviation while knives, scrapers and retouched flakes have similar standard deviations. Knives are the longest of these tool types. The small size in projectile points reflects the fact that most projectile points recovered during this project were small arrow points.

Figure 130 shows comparisons in width for the tool types. As with length, projectile points have a small standard deviation while knives, scrapers and retouched flakes have similar standard deviations and means. Figure 131 shows comparisons in thickness. Projectile points, knives and retouched flakes have similar means and standard deviations while scrapers are substantially thicker and have a higher standard deviation. This suggests scrapers were made from a variety of flake blanks (i.e., both thin and thick flakes) while projectile points, knives and retouched flakes are most frequently made from thin flakes.

Figure 132 shows comparisons in edge angles. Wilmsen (1968a, 1968b, 1970) has inferred that cutting operations are performed best with tools having acute edge angles between 26 to 35 degrees. Edge angles between 46 and 55 degrees are suitable for a number of functional applications. These could be used for skinning and hide preparation, plant-fiber shredding, cutting bone or horn or maybe tool back-blunting. Steeper angles of 66 to 75 degrees are best suited for wood and bone working, skin softening and heavy shredding. In this analyses projectile points have a mean retouched blade angle of 44 degrees, knives have 48 degrees, scrapers have 75 degrees and retouched flakes have 60 degrees.

Projectile points and knives have similar edge angles that suggest they were suitable for performing a number of tasks. The scrapers are probably best suited for wood and bone working, skin softening and heavy shredding. Edge angles for retouched flakes are between Wilmsen's (1968a, 1968b, 1970) 46-55 and 66-75 degree categories. The author believes most of the retouched flakes in this study represent expedient tools made to perform a single task for only a brief period of time. The relatively steep edge angles suggest they were used to perform scraping tasks. More information regarding the probable function of these tools is provided below with an examination of use-wear of the working edges. The standard deviations for all four tool types are relatively low, with projectile points having the lowest. Scrapers and retouched flakes have the greatest standard deviations.

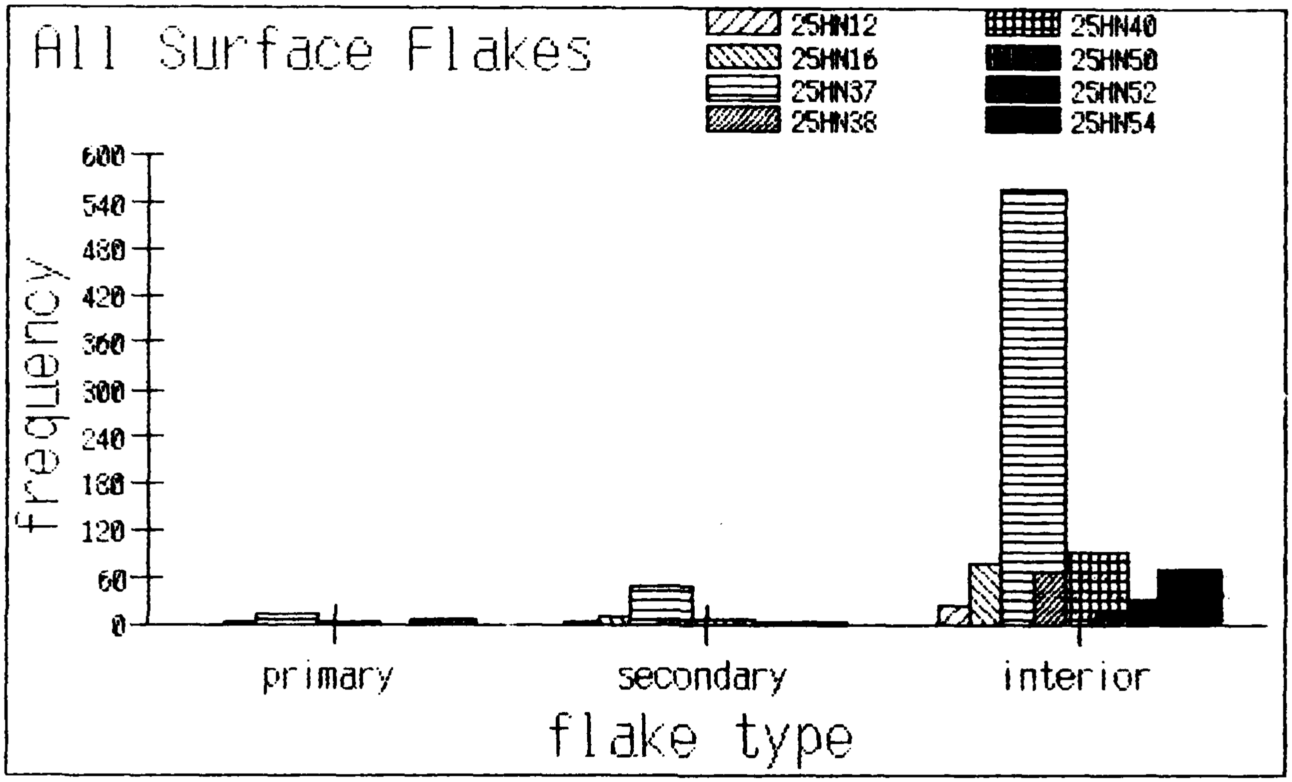


Figure 114. Frequency for surface flake type, 25HN12, 25HN16, 25HN37, 25HN38, 25HN40, 25HN50, 25HN52, 25HN54.

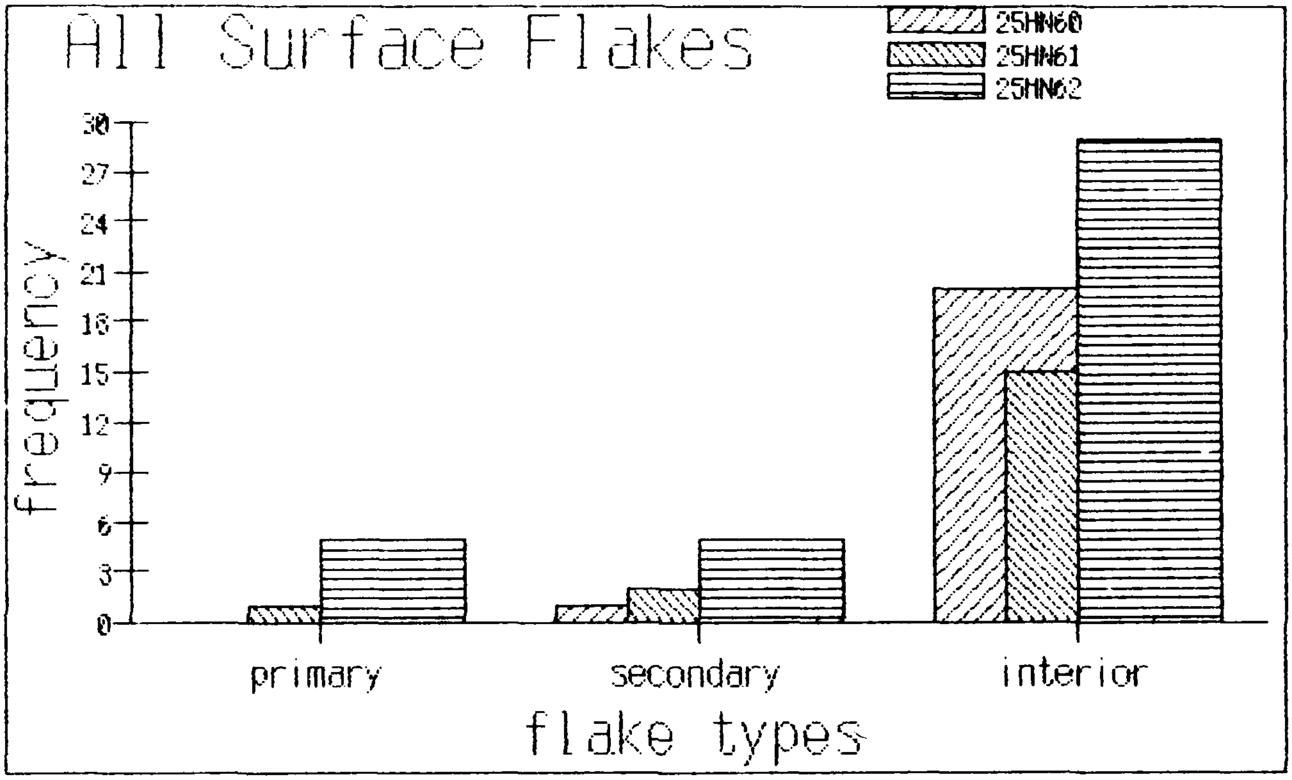


Figure 115. Frequency for surface flake type, 25HN60, 25HN61 and 25HN62.

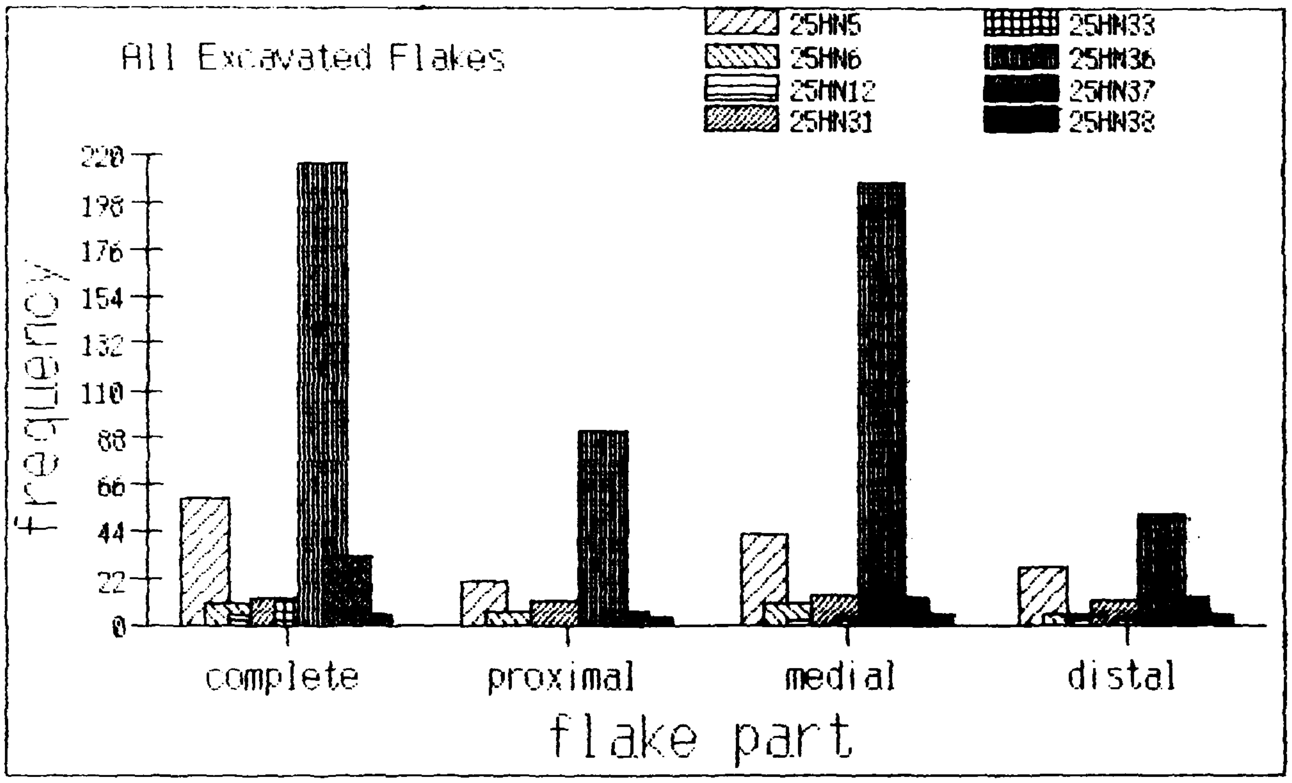


Figure 116. Frequency for excavated flake part, 25HN5, 25HN6, 25HN12, 25HN31, 25HN33, 25HN36, 25HN37, and 25HN38.

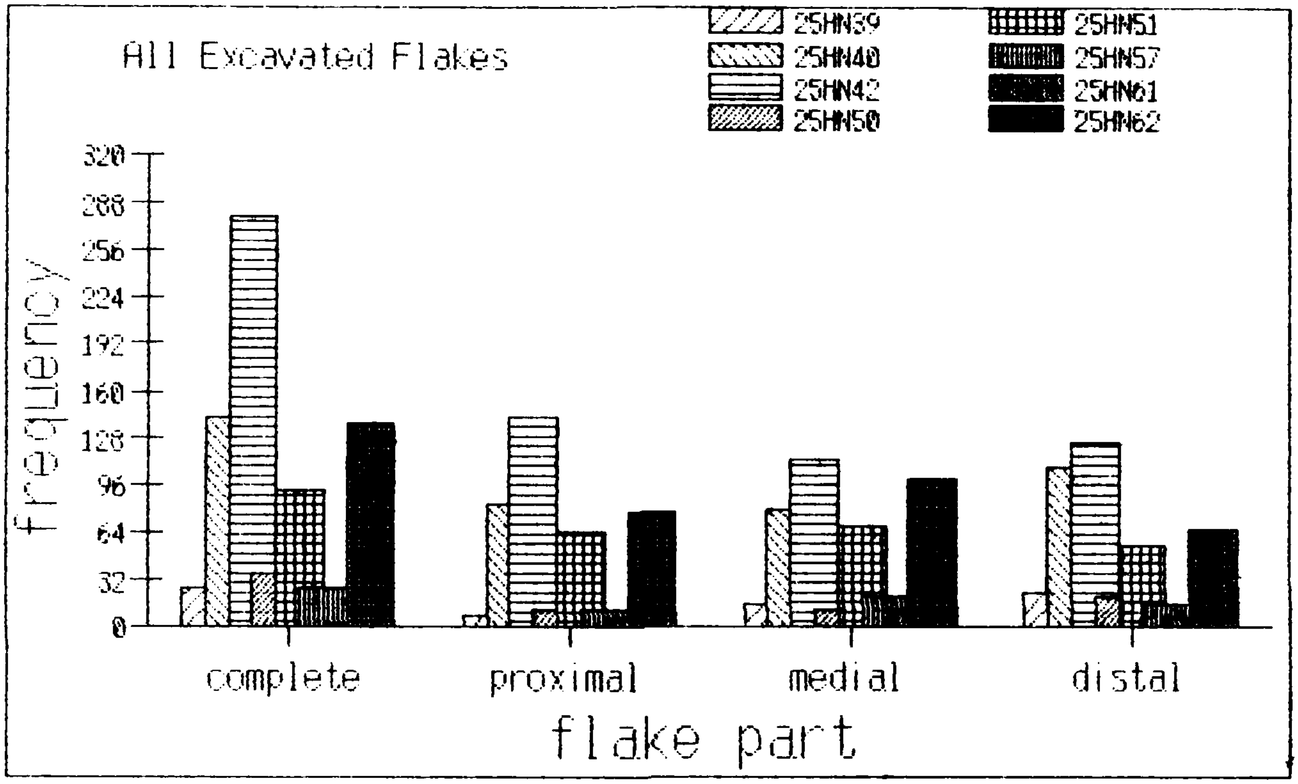


Figure 117. Frequency for excavated flake part, 25HN39, 25HN40, 25HN42, 25HN50, 25HN51, 25HN57, 25HN61, and 25HN62.

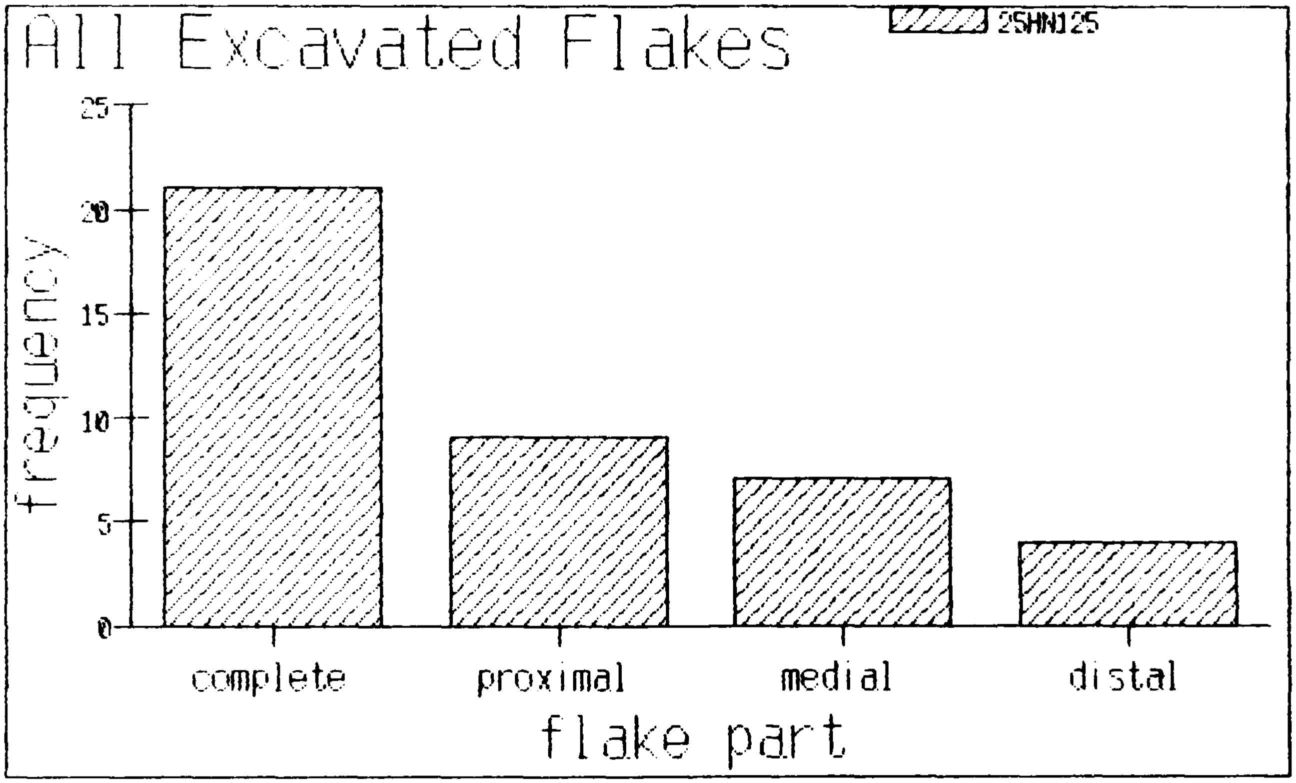


Figure 118. Frequency for excavated flake part, 25HN125.

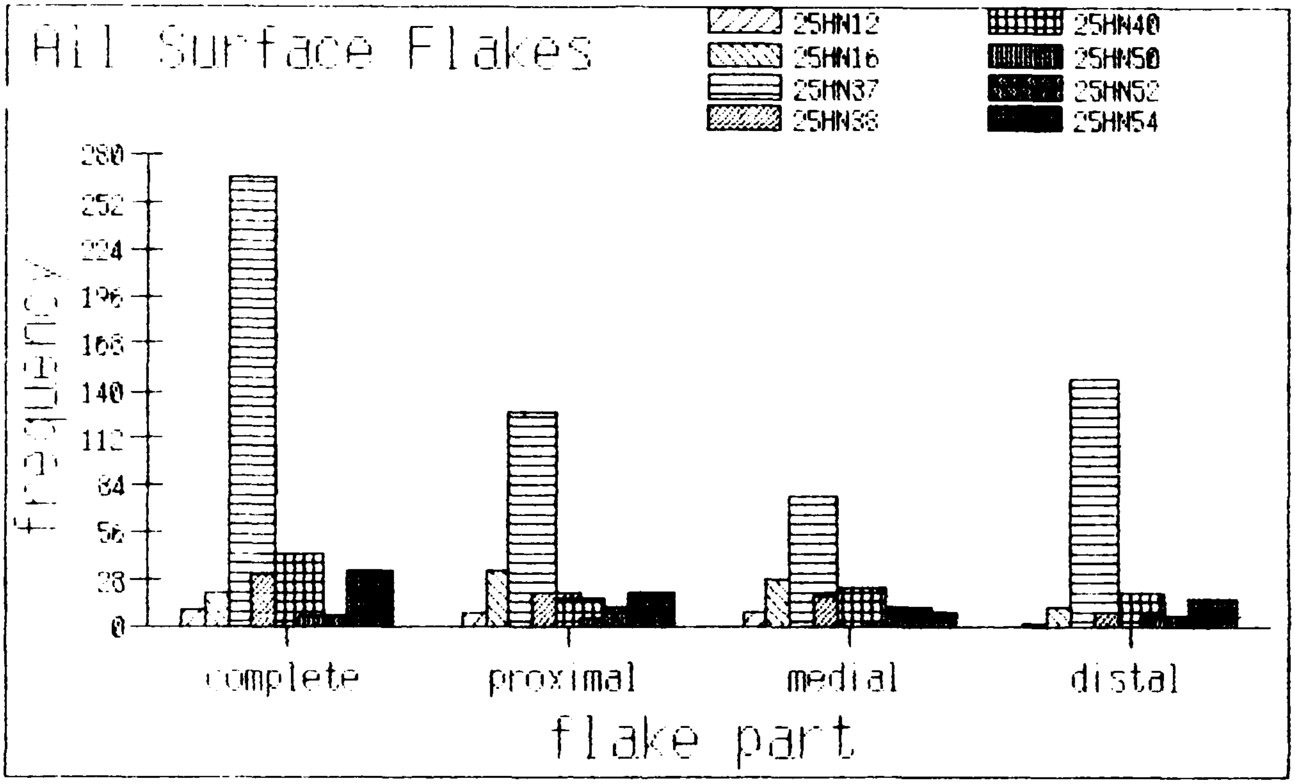


Figure 119. Frequency for surface flake part, 25HN12, 25HN16, 25HN37, 25HN38, 25HN40, 25HN50, 25HN52, and 25HN54.

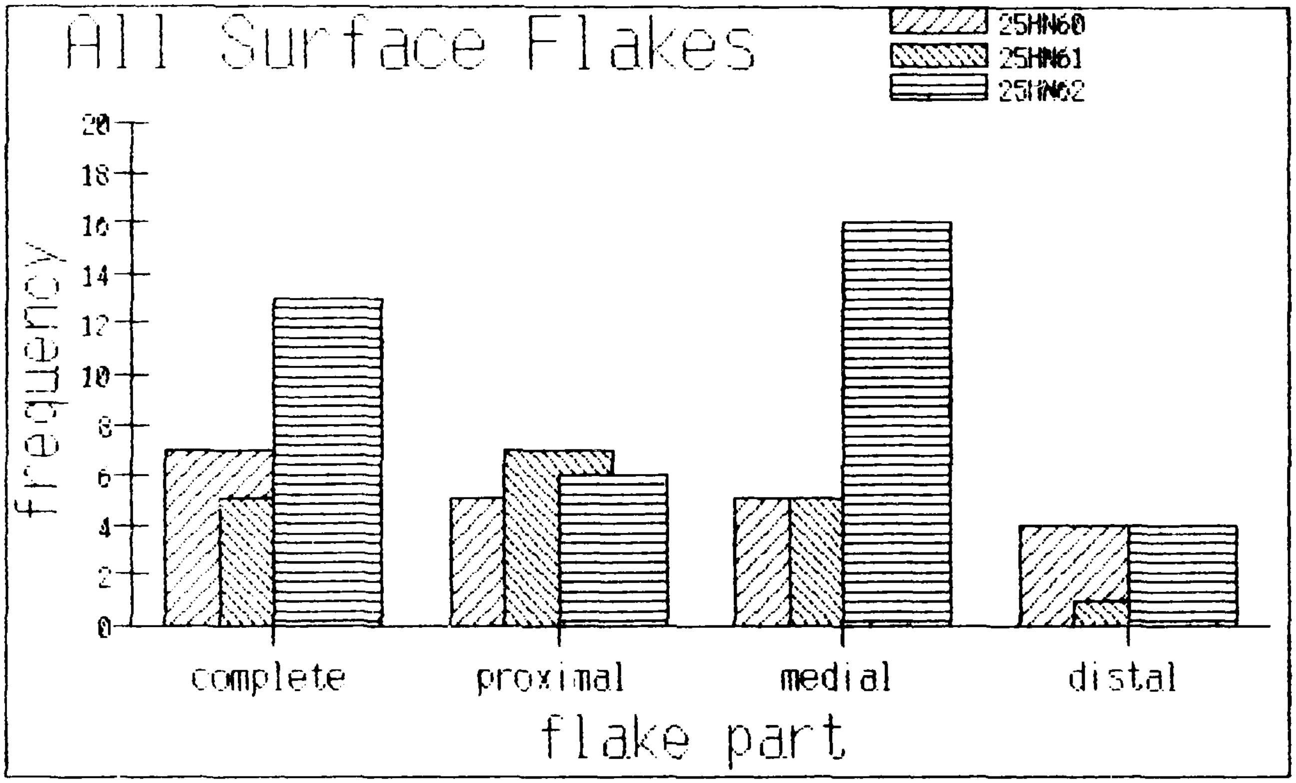


Figure 120. Frequency for surface flake part, 25HN60, 25HN61, and 25HN62.

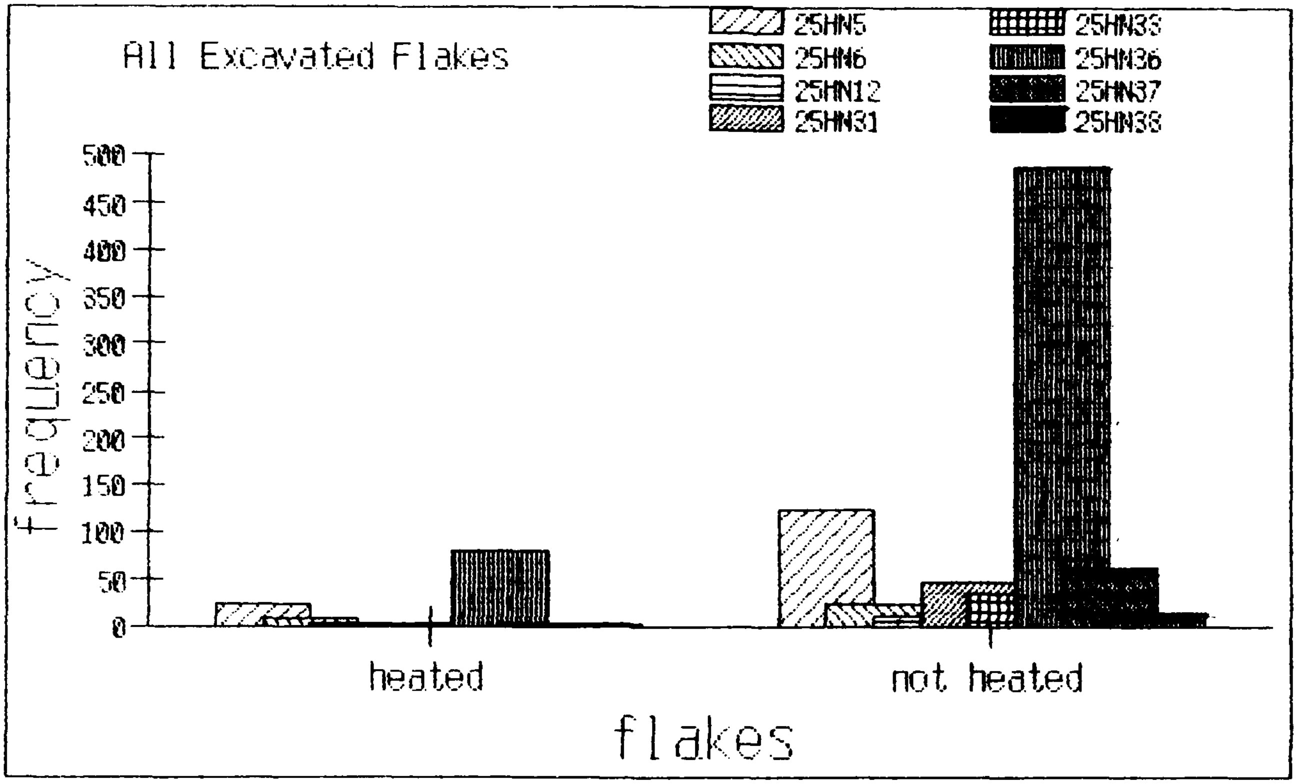


Figure 121. Frequency for heated/not heated excavated flakes, 25HN5, 25HN6, 25HN12, 25HN31, 25HN33, 25HN36, 25HN37, and 25HN38.

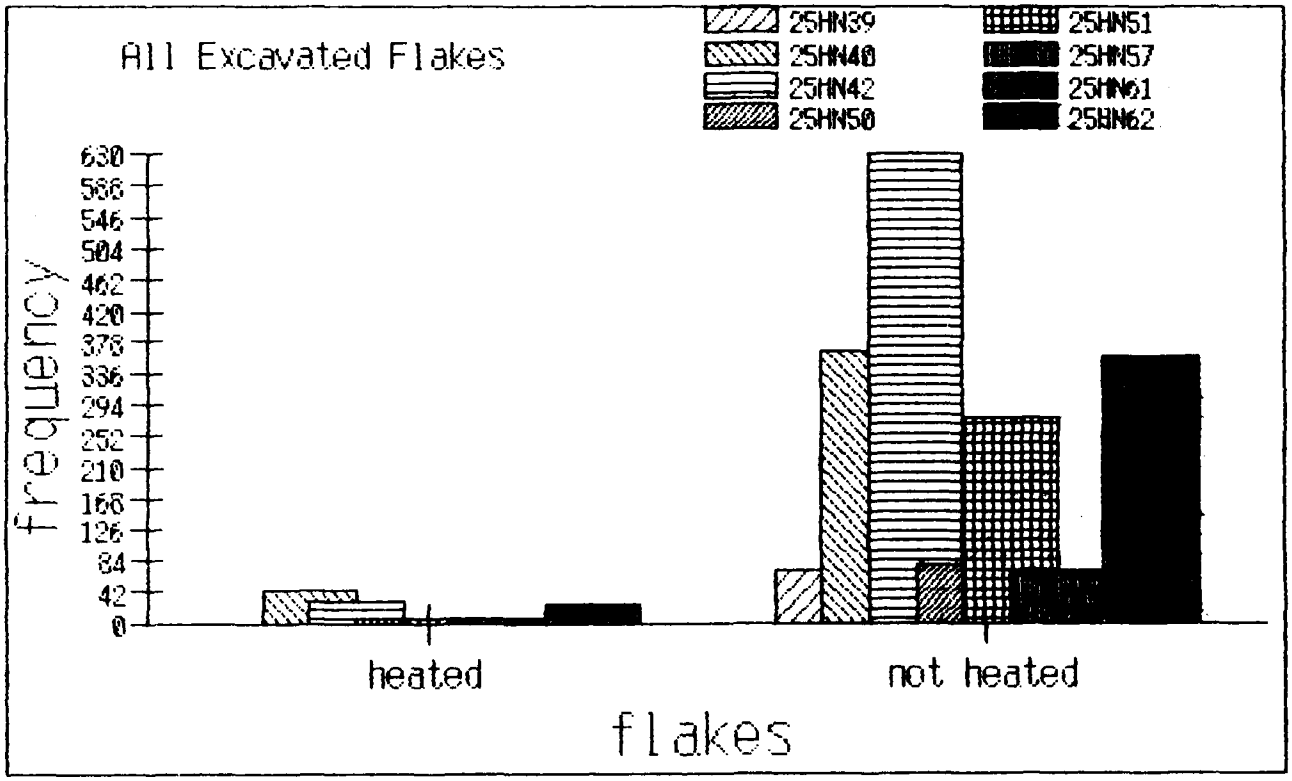


Figure 122. Frequency for heated/not heated excavated flakes, 25HN39, 25HN40, 25HN42, 25HN50, 25HN51, 25HN57, 25HN61, and 25HN62.

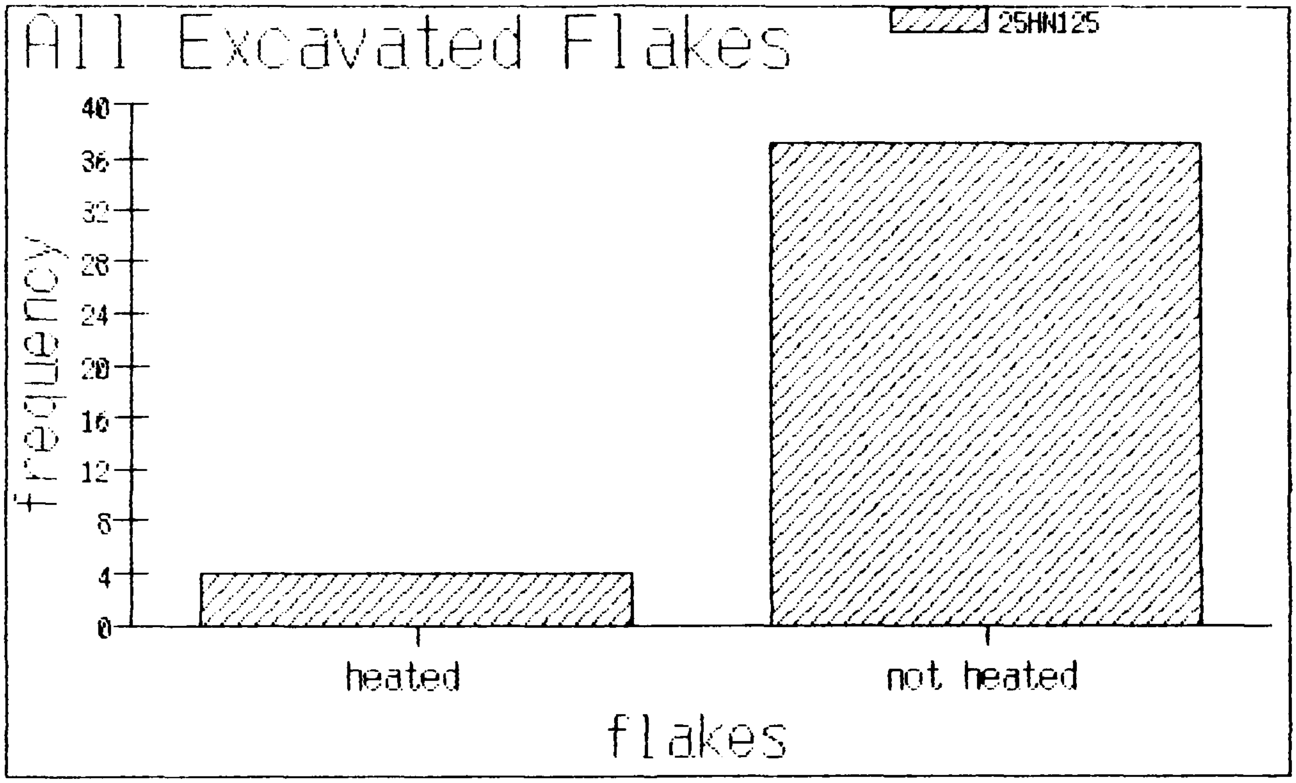


Figure 123. Frequency for heated/not heated excavated flakes, 25HN125.

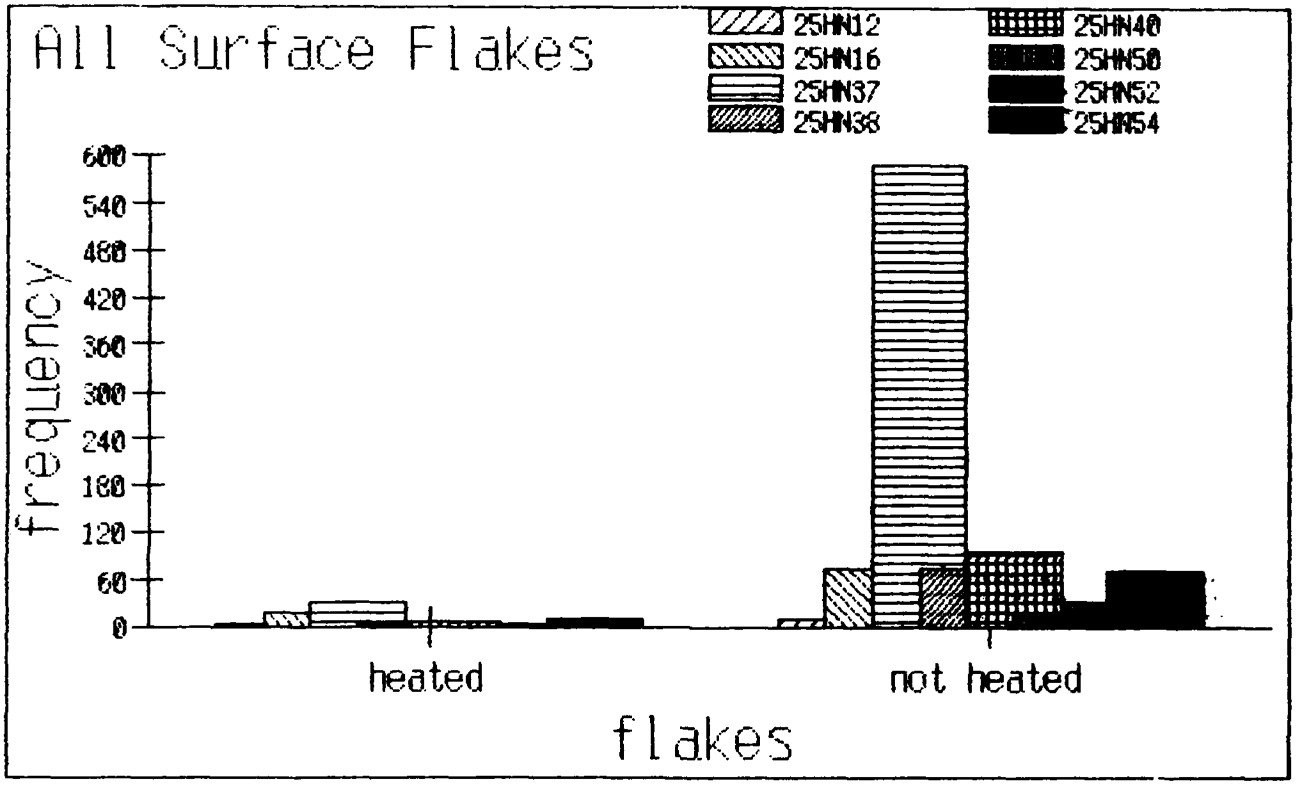


Figure 124. Frequency for heated/not heated surface flakes, 25HN12, 25HN16, 25HN37, 25HN38, 25HN40, 25HN50, 25HN52, and 25HN54.

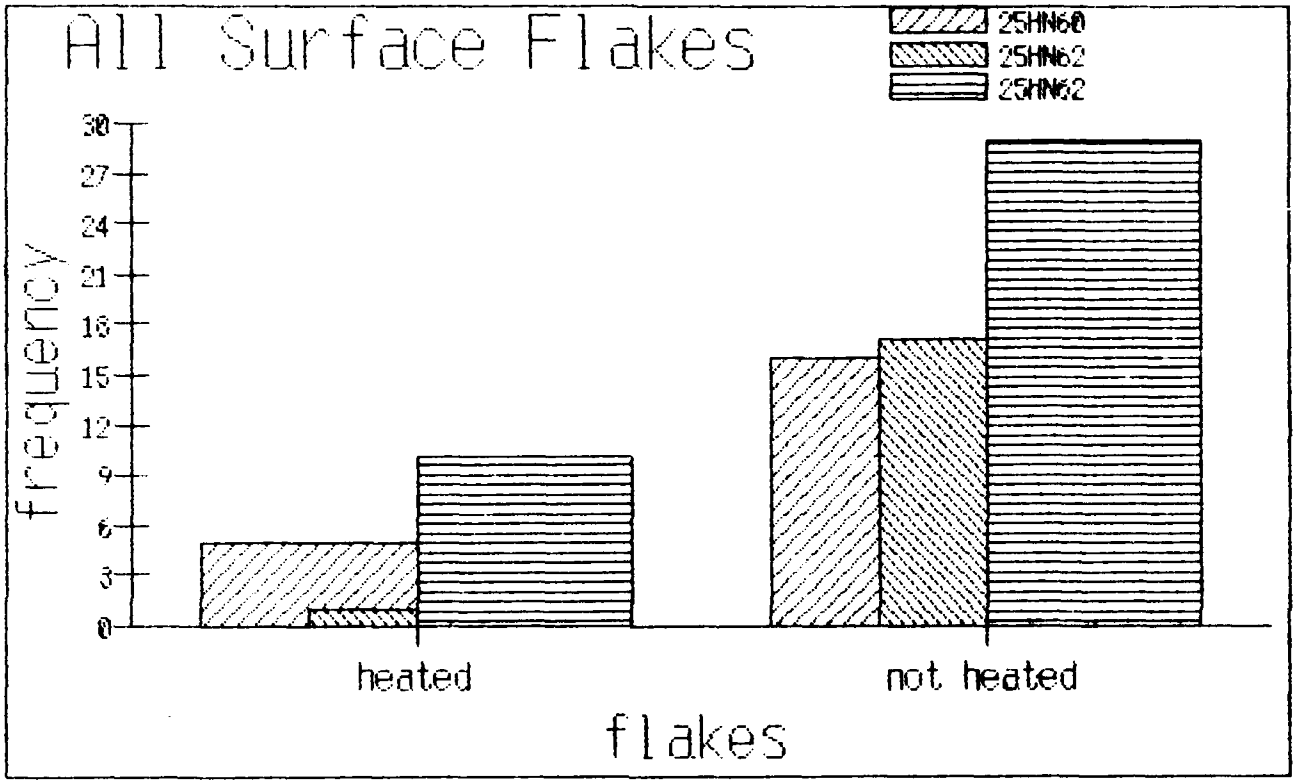


Figure 125. Frequency for heated/not heated surface flakes, 25HN60, 25HN61, and 25HN62.

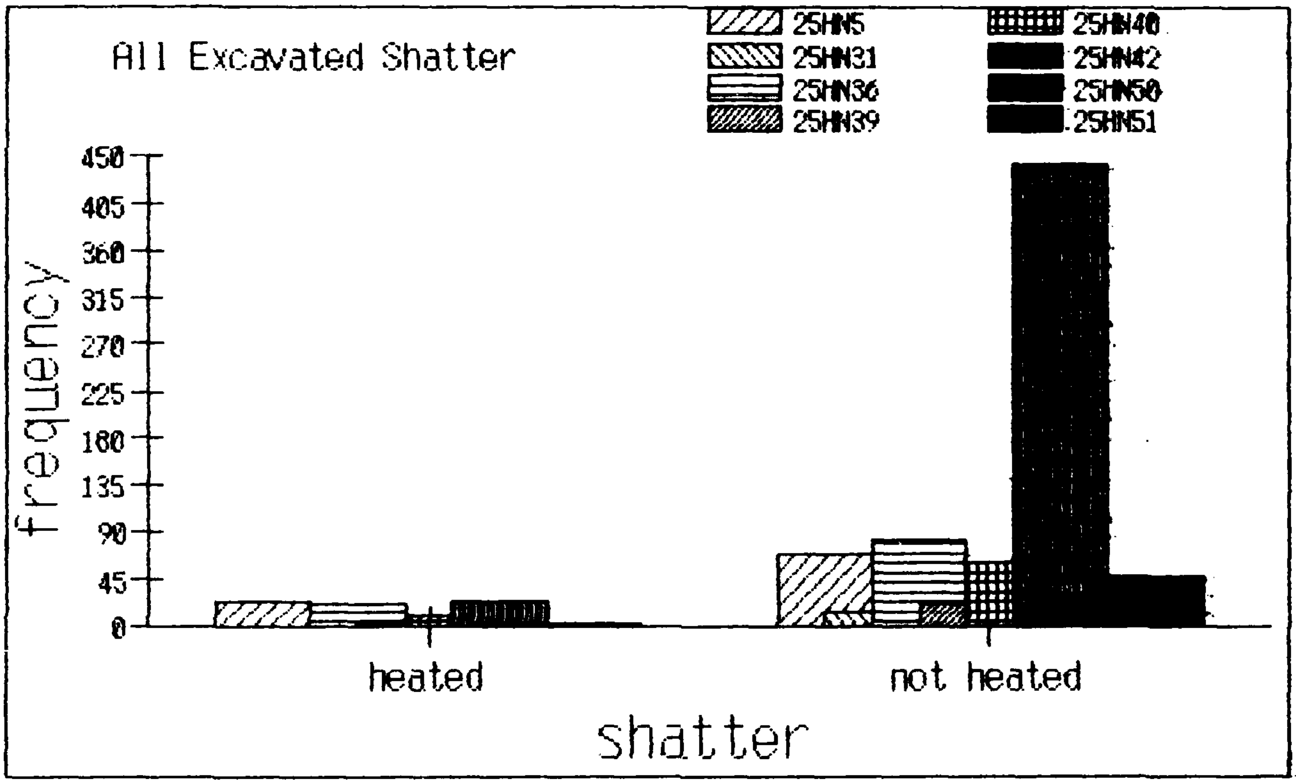


Figure 126. Frequency for heated/not heated excavated shatter, 25HN5, 25HN31, 25HN36, 25HN39, 25HN40, 25HN42, 25HN50, and 25HN51.

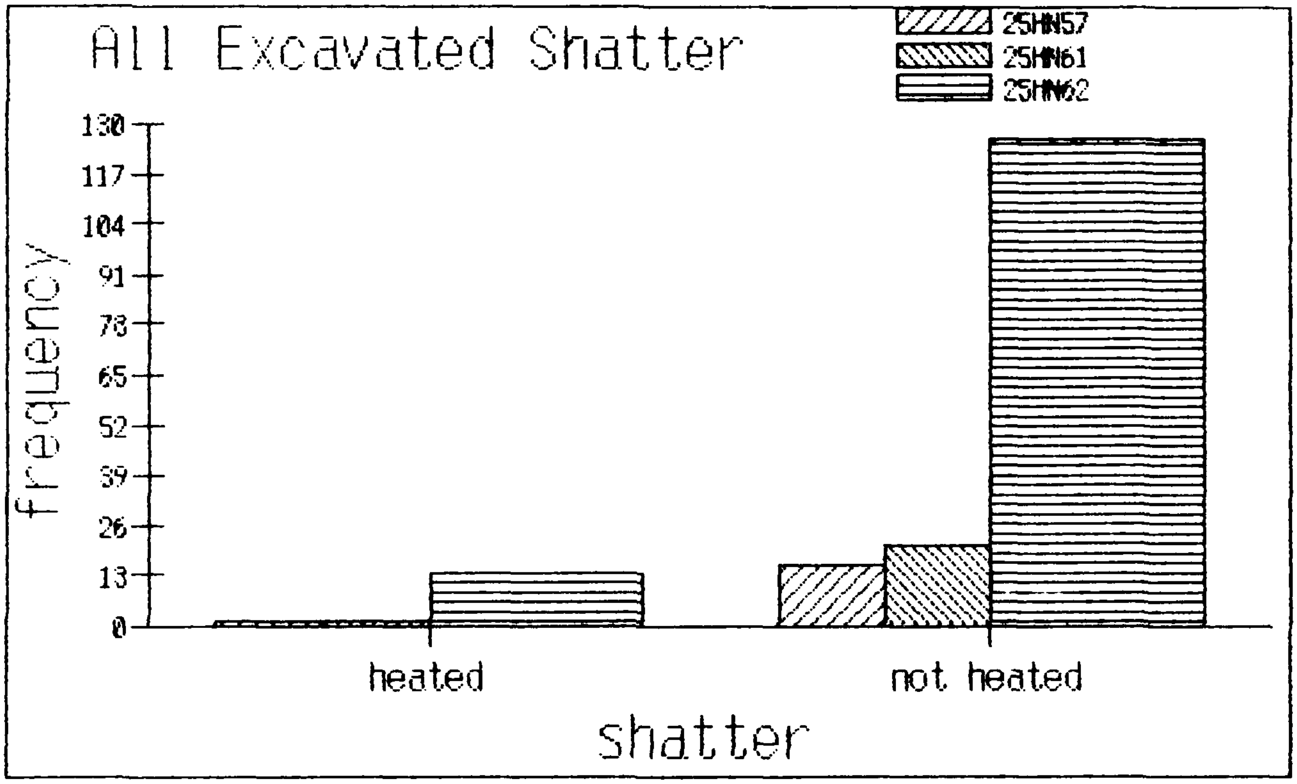


Figure 127. Frequency for heated/not heated excavated shatter, 25HN57, 25HN61, and 25HN62.

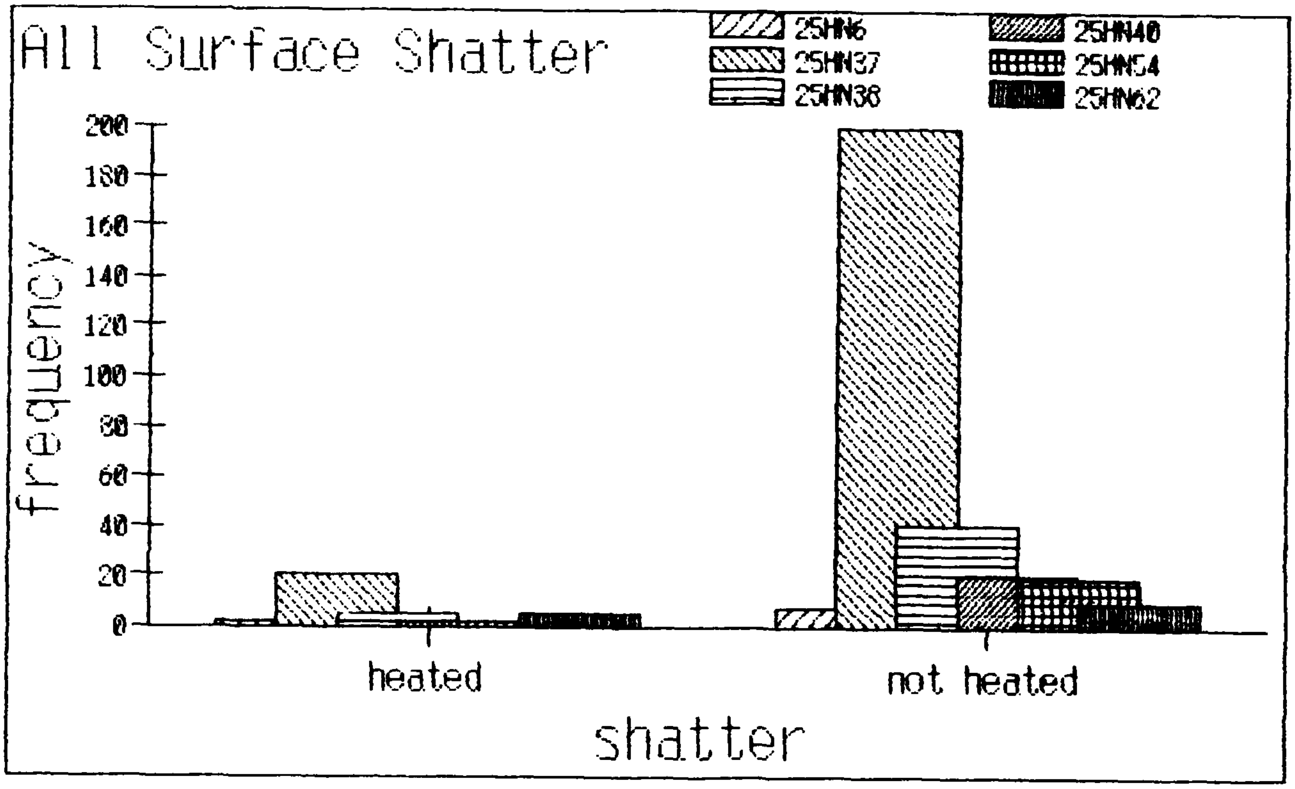


Figure 128. Frequency for heated/not heated surface shatter, 25HN6, 25HN37, 25HN38, 25HN40, 25HN54, and 25HN62.

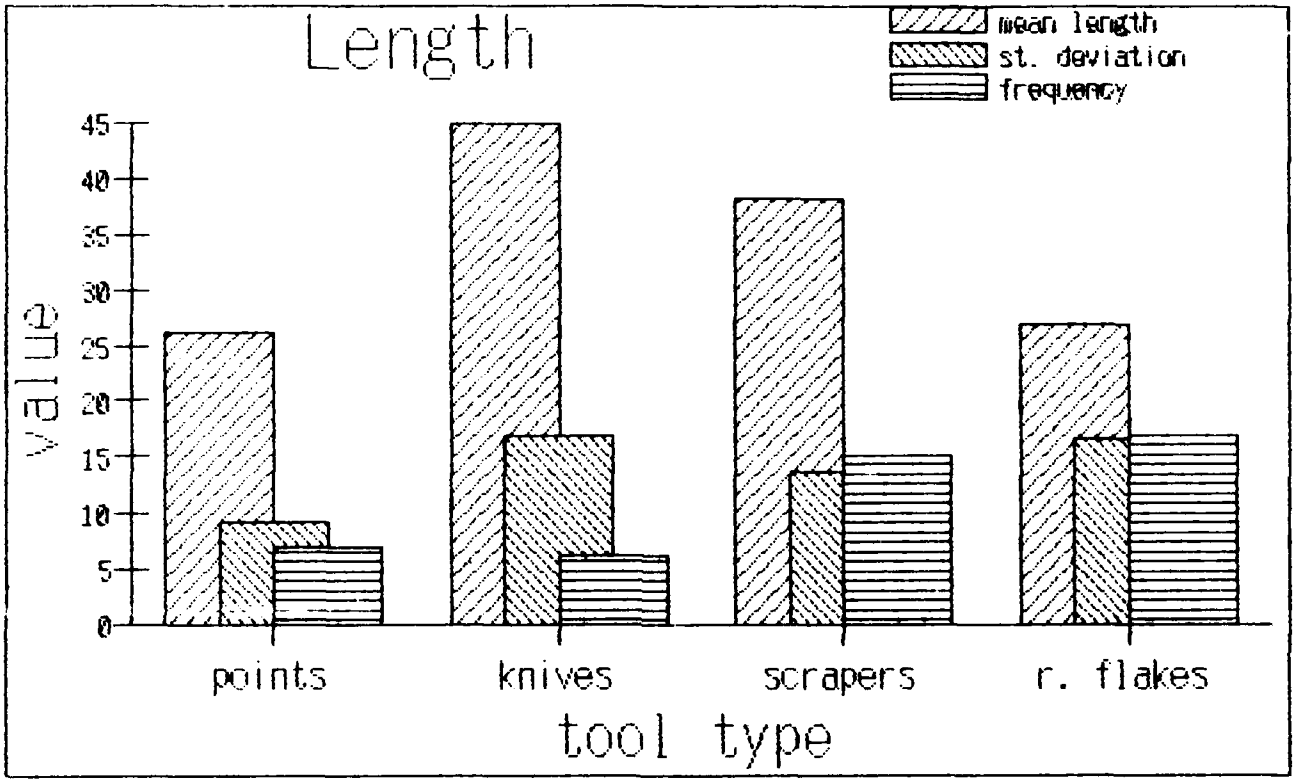


Figure 129. Mean length, standard deviation and frequency for projectile points, knives, scrapers, and retouched flakes.

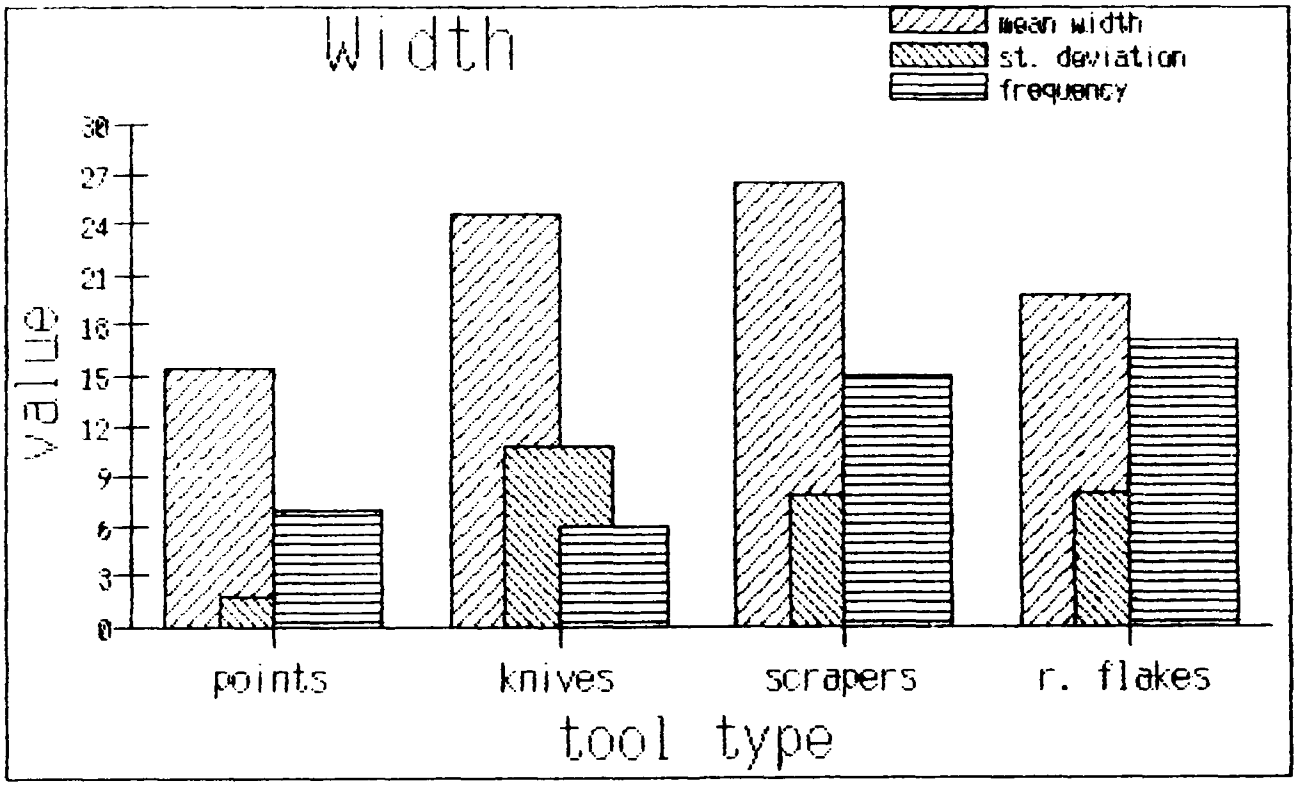


Figure 130. Mean width, standard deviation, and frequency for projectile points, knives, scrapers, and retouched flakes.

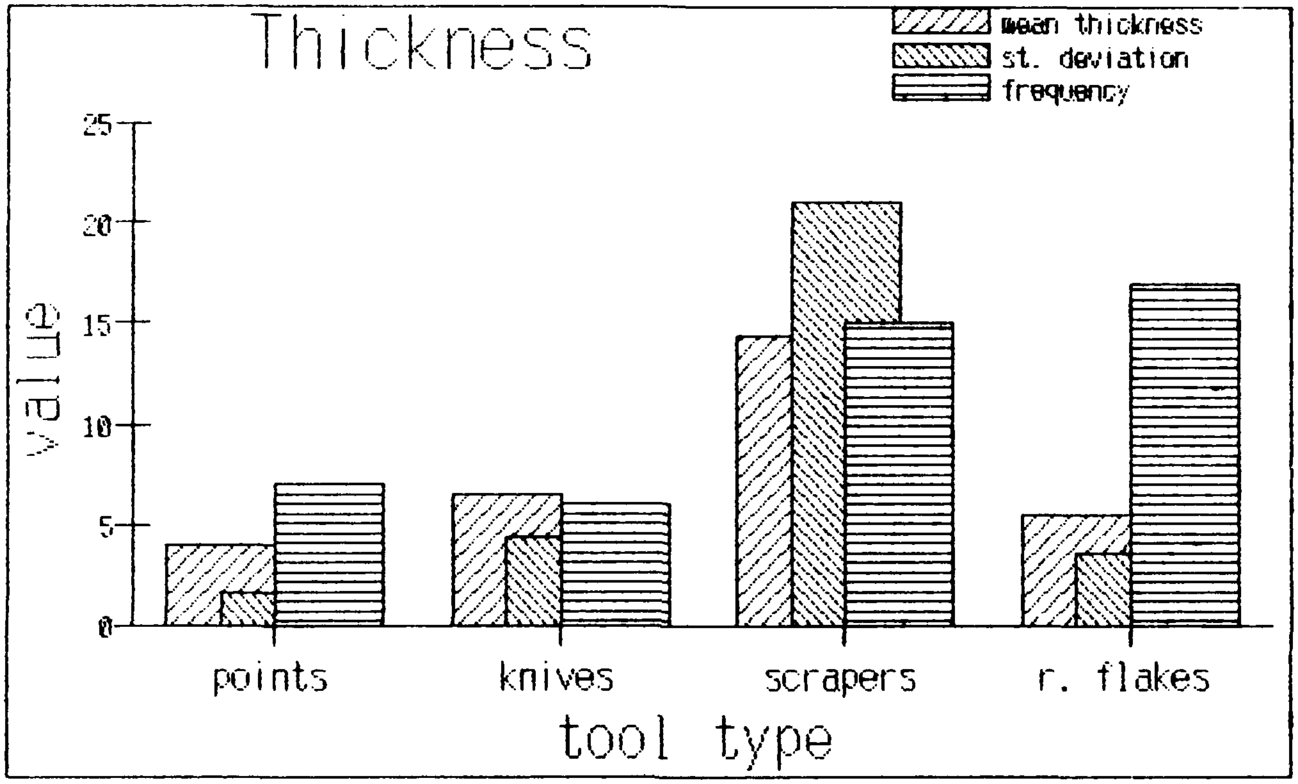


Figure 131. Mean thickness, standard deviation, and frequency for projectile points, knives, scrapers, and retouched flakes.

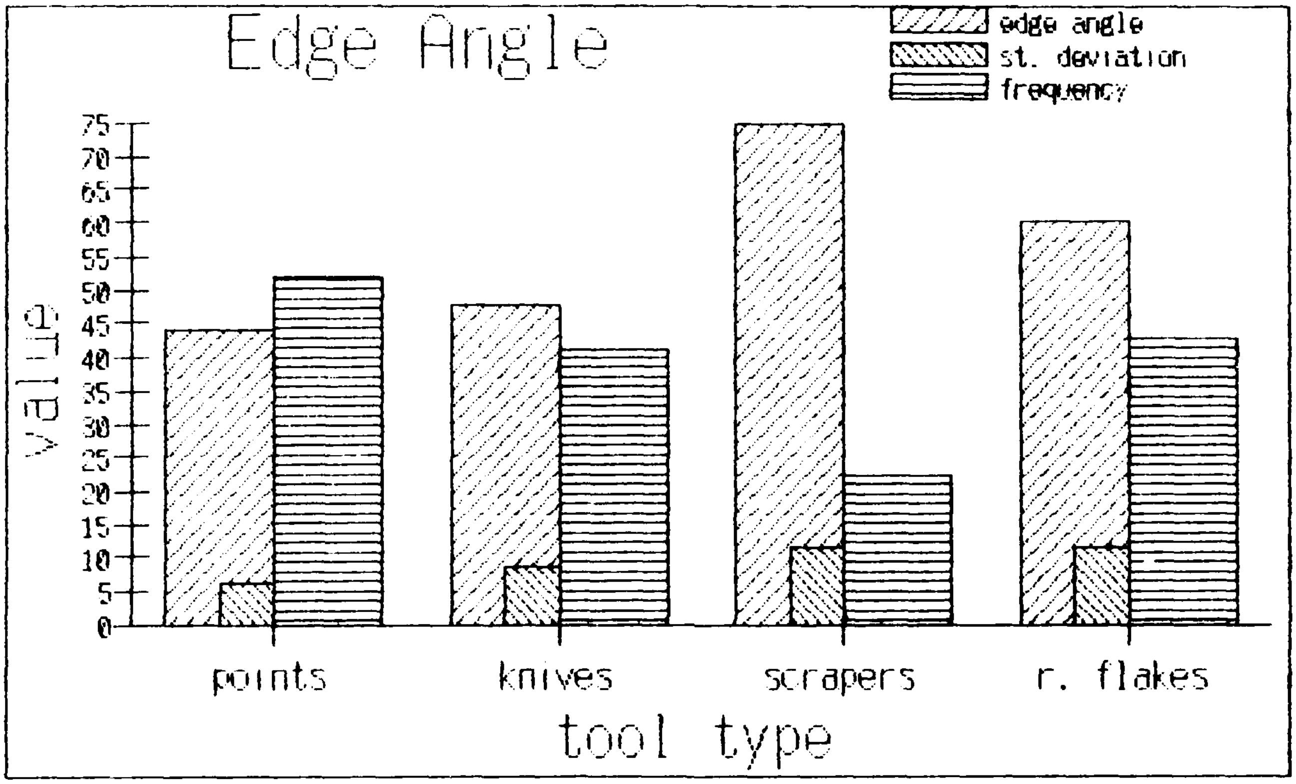


Figure 132. Edge angle, standard deviation and frequency for projectile points, knives, scrapers, and retouched flakes.

Table 81
Summary Statistics for Chipped Stone Tools

Attribute	Mean Average	Standard Deviation	Frequency
Projectile Points			
length	26.19	9.06	7
width	15.40	1.73	7
thickness	4.00	1.51	7
edge angle	44.04	6.03	52
Knives			
length	44.73	16.76	6
width	24.65	10.72	6
thickness	6.52	4.32	6
edge angle	47.68	8.81	41
Scrapers (end, side, disto-lateral)			
length	38.11	13.70	15
width	26.52	7.92	15
thickness	14.49	21.14	15
edge angle	74.77	11.49	22
Retouched Flakes			
length	26.95	16.56	17
width	19.78	7.95	17
thickness	5.42	3.60	17
edge angle	60.47	11.64	43
All Modified Chipped Stone (except for cores and tested)			
thickness	5.99	4.01	152

Raw material types present in the artifact collections from the study sites are of several sources (Table 82, Appendix A). The most frequently occuring is Niobrarite (Smoky Hills jasper, Upper Republican jasper) which occurs locally (Wright 1985). Small frequencies of Permian chert (Flint Hills Flint), green quartzite (Wedel 1986:30-31) or Flattop chalcedony, local chalcedony, quartz, solid quartzite (Spanish diggings), petrified wood and a material that compares favorably with Alibates Flint, occur. The material that compares favorably with Alibates Flint may or may not be from the Alibates Flint Quarry in northwest Texas (see Shaeffer 1958; Green and Kelley 1960). There is little evidence of trade for raw material for the manufacture of chipped stone artifacts. Most materials occur locally or within a short distance of Harlan County, Nebraska (see Carlson and Peacock 1975; Holen 1983).

Examination of retouched edges, with a Bausch and Lomb binocular microscope at 30X to 45X, permitted recording observable use-wear patterns on the chipped stone tools. The following is a summary of findings. Figures 133, 134 and Table 83 show the frequency of seven forms of wear for 18 tool types. Projectile point blades have predominately no wear or rounding. A few specimens exhibit rounding/crushing. It is suspected that the rounding may be attributed to natural abrasion since many of the projectile points were recovered from the surface. Use-wear may not develop on projectile points unless they were used for tasks other than piercing animal skins (i.e., killing). Some projectile points, such as the ones that exhibit rounding/crushing, may have been used as knives. Four points did not have their blades, therefore use-wear was not determinable.

Most endscrapers (Fig. 133 and Plate 12) exhibit rounding, crushing or a combination of rounding/crushing. Many of the scrapers that exhibit rounding have observable striations that are perpendicular to the scraping edge, indicating their mode of use was pushing and/or pulling. It is believed these were used to soften hides. Their rounded edges would not have been suitable for scraping fat from hides. Endscrapers with crushing and/or crushing/step faceting suggest use in modifying harder materials such as wood or bone. Scrapers with rounding/ crushing suggest use in scraping fat from hides or working harder materials such as soft wood.

Side scrapers and disto-lateral scrapers (Fig. 133) have rounding/crushing as their only type of wear. This suggests their use in hide preparation or modifying harder materials such as soft wood. Knives (Fig. 133) exhibit no wear, rounding, crushing and rounding/crushing. Those with

Table 82

Types of Raw Materials for Chipped Stone Tools

Tool Type	Frequency	Raw Material
projectile points	1	Permian chert
	36	Niobrarite
	3	local chalcedony
scrapers (end, side and disto-lateral)	3	Permian chert
	45	Niobrarite
	1	Flattop Chalcedony (Colorado)
	1	Flattop Chalcedony (SW South Dakota)
	1	local chalcedony
gravers	2	Niobrarite
notches (spoke shaves)	2	Niobrarite
knives	4	Permian chert
	35	Niobrarite
	1	Flattop Chalcedony (Colorado)
denticulate scrapers	2	Permian chert
choppers	2	Niobrarite
cores	4	Niobrarite
	1	Green quartzite
preforms	1	local chalcedony
retouched flakes	1	Permian chert
	36	Niobrarite
	3	local chalcedony
bifacial resharpening flakes	10	Niobrarite
unifacial resharpening flakes	1	Niobrarite
tested material	1	Niobrarite
drills	2	Niobrarite

no wear may have either been recently sharpened or had not been used for a long enough time to produce discernible wear. Knives with rounding suggest use on softer materials such as hides and soft wood. Knives with crushing suggest use on hard materials such as dry wood or bone while those with rounding/crushing are most likely to have been used on medium hard materials such as green wood.

Choppers (Fig. 133) exhibit crushing/step faceting and rounding/crushing/step faceting. This wear is indicative of use on hard materials such as wood and bone. Most retouched flakes (Fig. 133) have crushing and rounding/ crushing. A few have either rounding or no wear. This wear suggests use on hard materials (crushing) such as wood and bone, and in hide preparation (rounding/crushing) such as scraping fat. The steeper edge angles (Fig. 132) in conjuction with the use-wear suggests scraping, as opposed to cutting, activities.

Sharpening flakes from bifacial tools (Fig. 133) have crushing and rounding/crushing on the former working edges. This suggests the bifacial tools that were being sharpened, to renew their cutting edges, were used on hard materials such as wood and bone. Most tools that may have functioned as either projectile points or knives (projectile points/knives) have no wear, rounding/crushing or rounding. The absence of wear suggests they may have functioned as projectile points since use as knives would more likely produce use-wear or they had recently been sharpened. Those with rounding/ crushing are most likely to have been used for cutting soft materials such as green wood or hides.

The remaining tool types have only one specimen for any of the forms of use-wear (Fig. 134). Gravers, notches, denticulates and drill/gravers have either crushing or rounding/crushing/step faceting that suggest use on hard materials such as wood and bone. The preform and drill fragment do not have discernible wear. The drill fragment consists of the base or hafting element, consequently the working edge (bit) is missing. The notch/ endscraper has rounding/crushing indicating use on relatively hard materials such as green wood. The indeterminate tools have crushing and rounding/crushing, also suggesting use on hard materials.

Examination of fractures for projectile points, knives and projectile points/knives indicate most are lateral breaks that likely resulted from bending of the tool in its haft to a shaft or handle (Fig. 135 and Plates 13 and 14). Two projectile points that are complete with the exception

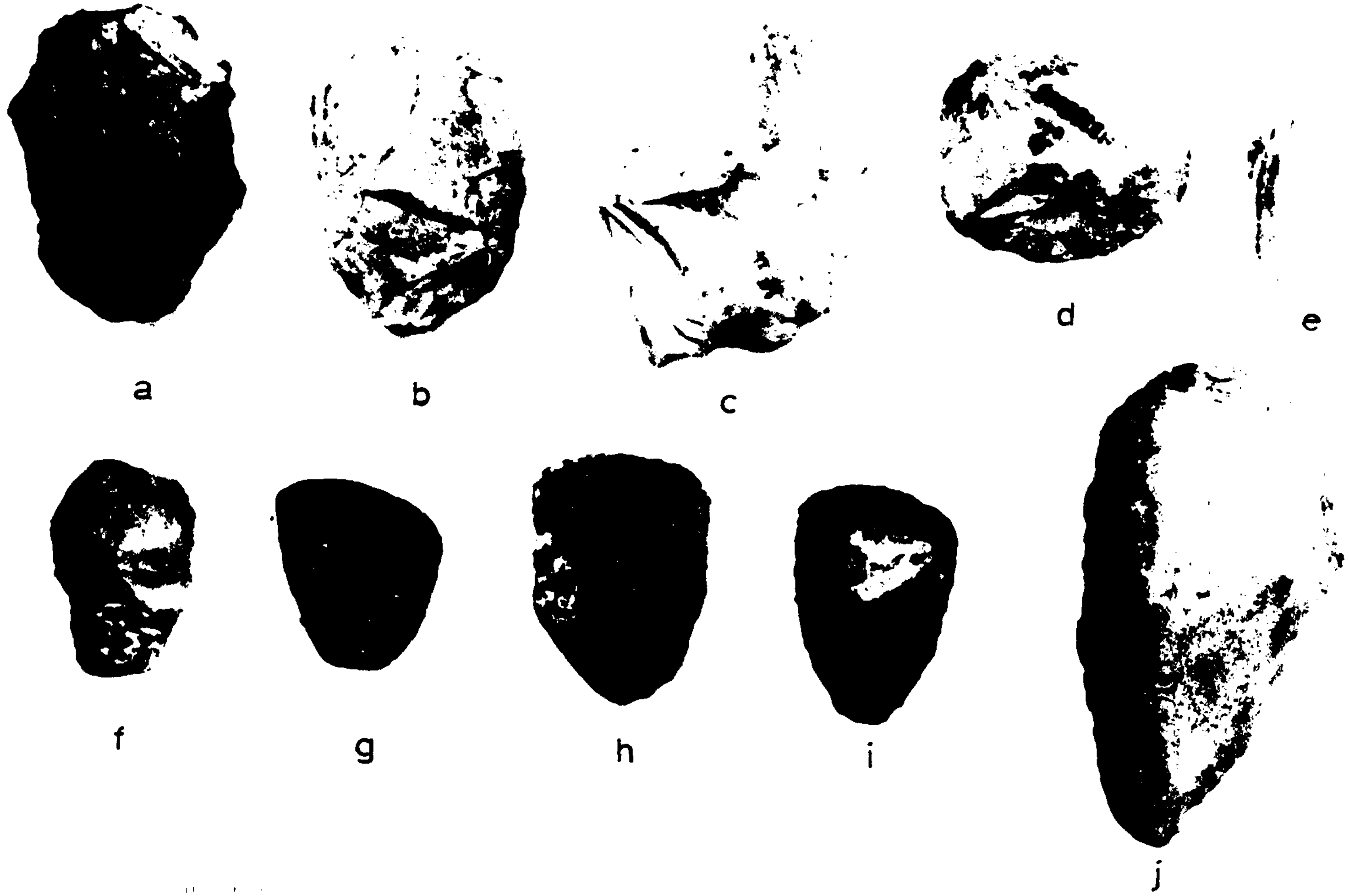


Plate 12. Scrapers from investigated sites: a) 25HN3785007; b) 25HN3785004; c) 25HN3785001; d) 25HN3785005; e) 25HN3585011; f) 25HN3785010; g) 25HN3685297; h) 25HN3685280; i) 25HN3985078; and j) 25HN3185010.

Table 83

Use-Wear

Tool Type	nw	r	c	r/c	c/sf	r/c/sf	?
projectile points	10	11	-	4	-	-	4
end scrapers	-	7	4	4	2	-	-
side scrapers	-	-	-	3	-	-	-
disto-lateral scrapers	-	-	-	2	-	-	-
gravers	-	-	1	-	-	-	-
notches	-	-	1	-	-	-	-
knives	4	5	2	7	-	-	-
denticulates	-	-	1	-	-	1	-
choppers	-	-	-	-	1	1	-
preforms	1	-	-	-	-	-	-
retouched flakes	2	4	17	19	-	-	-
resharpening flakes bifacial	-	-	6	4	-	-	-
resharpening flakes unifacial	-	-	1	-	-	-	-
drills	1	-	-	-	-	-	-
graver/drill	-	-	1	-	-	-	-
end scraper/notch	-	-	-	1	-	-	-
projectile point/ knife	12	2	-	9	-	-	-
? (indeterminate)	-	-	1	1	-	-	-

Key: nw - no wear; r - rounding; c - crushing; rc - rounding/crushing; c/sf - crushing/step faceting; ? - indeterminant; r/c/sf - rounding/crushing/step faceting

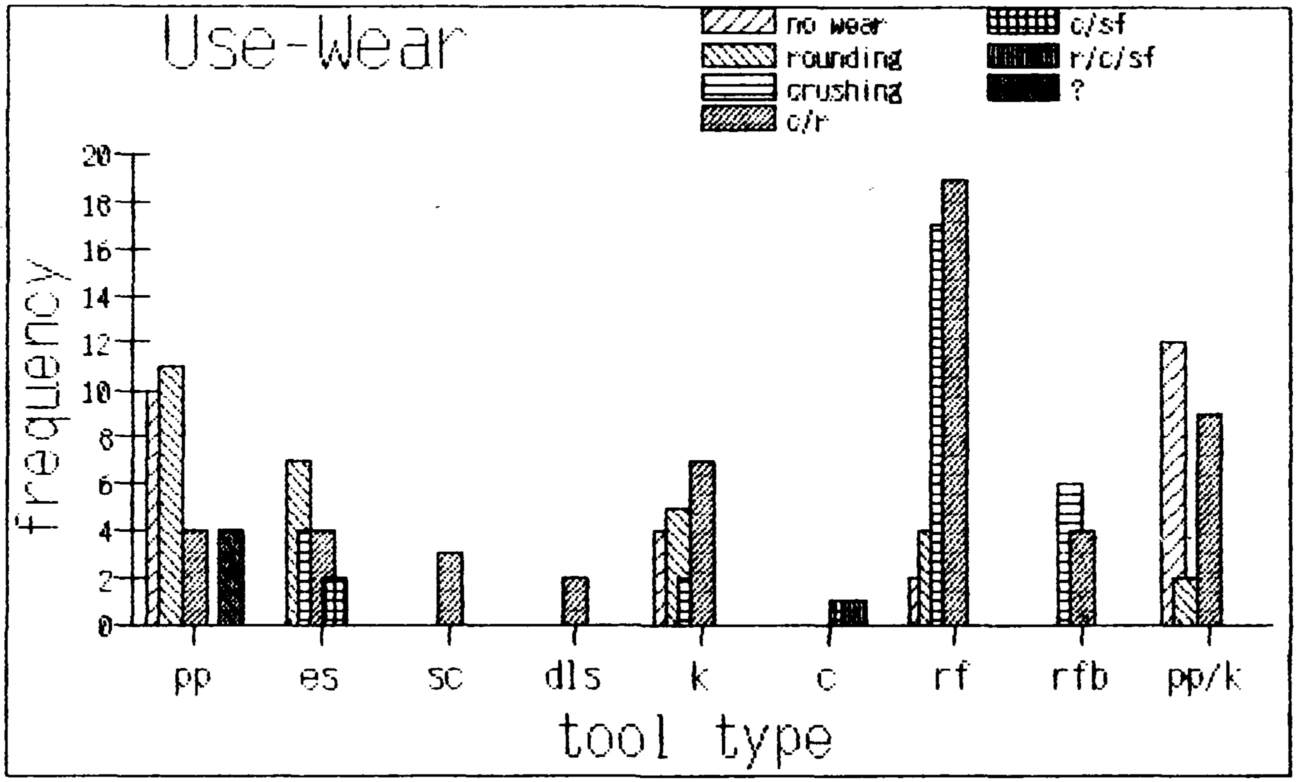


Figure 133. Frequency of observed use-wear on different tool types.

Key: pp - projectile points
es - end scrapers
sc - side scrapers
dls - disto-lateral scrapers
k - knives
c - choppers
rf - retouched flakes
rfb - resharpening flake/biface
pp/k - projectile points/knives

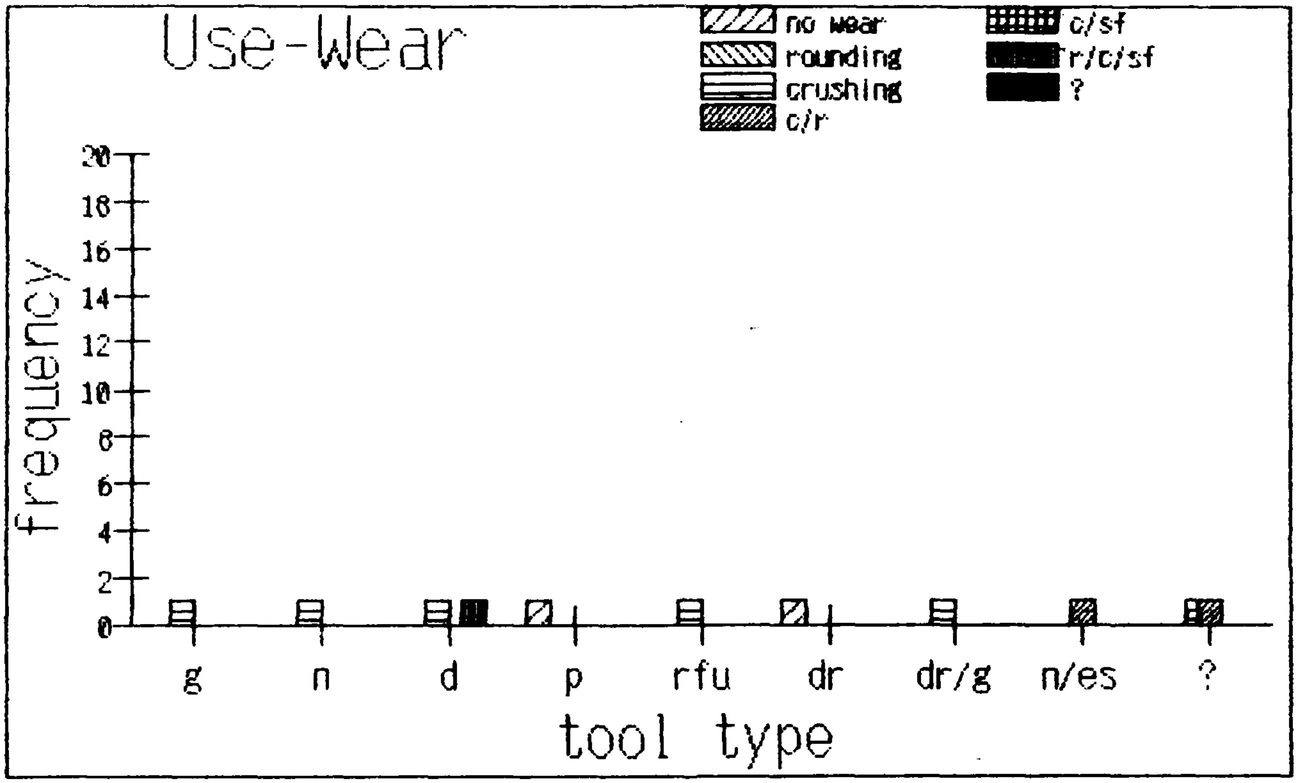


Figure 134. Frequency of observed use-wear on different tool types.

Key: g - gravers
n - notches
d - denticulates
p - preforms
rfu - resharpening flake/uniface
dr - drills
dr/g - drill/graver
n/es - notch/end scraper
? - indeterminate

of one-half (longitudinally) of the blade and several with tips missing appear to have impact fractures (Ahler 1970; Purdy 1975).

Only eight ground stone artifacts were recovered during field investigations (Plate 15). Five were recovered from the beach at site 25HN37 and one tool each was recovered from sites 25HN32, 25HN36 and 25HN38. The eight ground stone tools include three grooved, sandstone abrader fragments, one quartzite mano fragment, and three quartzite fragments. The sandstone, grooved abraders suggest use in modifying wood and bone. The other ground stone tool fragments may have been used in either the modification of bone and wood or preparation of food.

Summary

Lithic analyses indicate a limited number of activities were being performed at many of the sites in this study. The primary tasks being performed include hunting and butchering as evidenced by the presence of projectile points and knives. Hide preparation was a primary task as evidenced by scrapers with use-wear consisting of rounding and rounding/crushing. The modification of green wood, hard wood and bone are other primary tasks performed at sites in this study. Based on lithics alone, the primary subsistence economy of all of the cultures represented at the sites in this study was based on hunting and gathering. There are no stone hoes or celts that may have been employed in agricultural activities. The evidence for extensive wood and bone modification suggests agricultural implements are to be found in those forms of raw material.

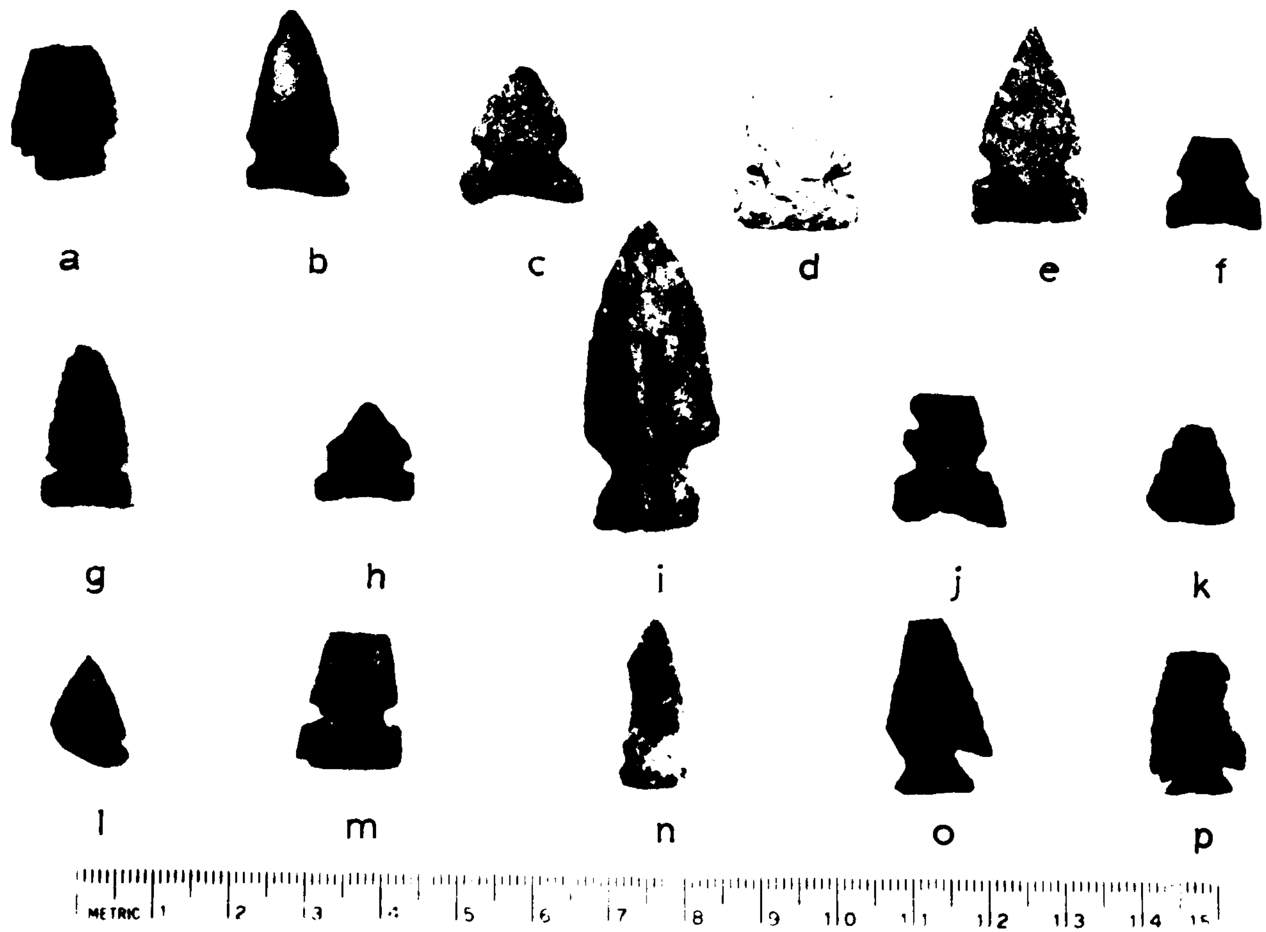


Plate 13. Projectile points from investigated sites: a) 25HN3285001; b)25HN3685299; c) 25HN3685289; d) 25HN3685001; e) 25HN3685290; f) 25HN3785021; g) 25HN3785018; h) 25HN3785259; i) 25HN4085013; j) 25HN4085009; k) 25HN4285038; l) 25HN4285039; m) 25HN585952; n) 25HN6285003; o) 25HN6285001; p) 25HN12585013.

Plate 14. Bifaces and knives from investigated sites: a) 25HN3785362; b) 25HN6285005; c) 25HN1685006; d) 25HN3785306; e) 25HN4085008; f) 25HN4085007; and g) 25HN3185007.

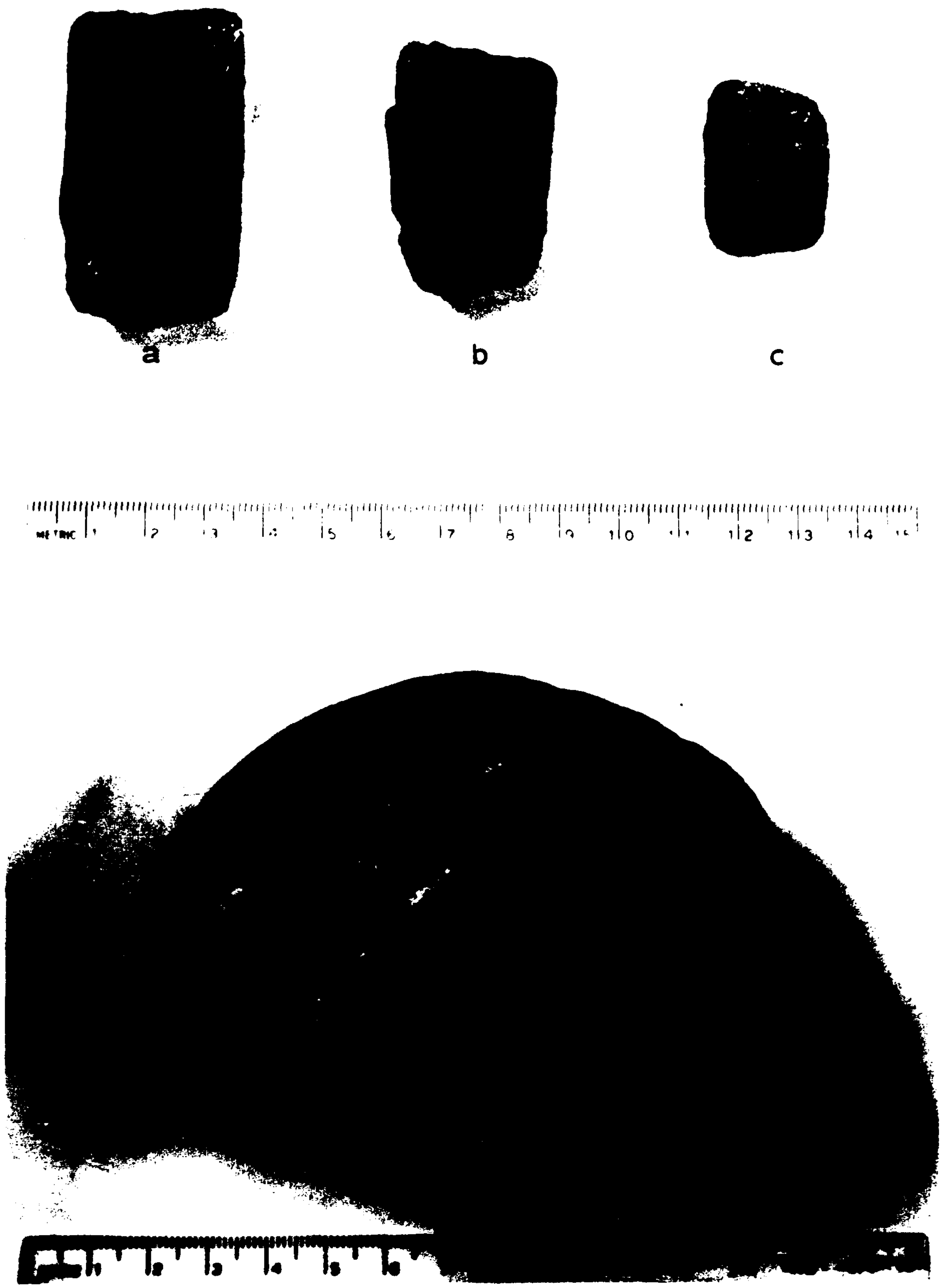


Plate 15. Ground stone tools: a) 25HN3785026; b) 25HN3785027; c) 25HN3685281; and mano, 25HN3885005.

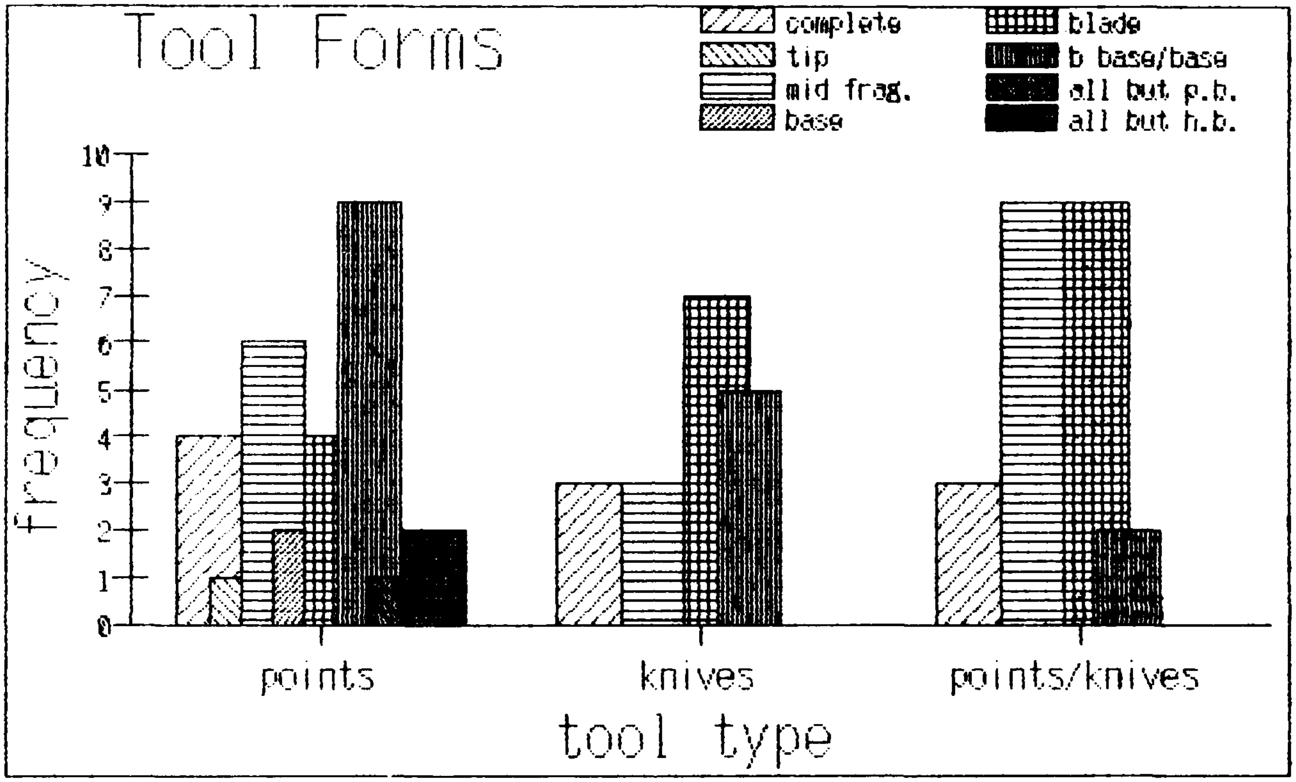


Figure 135. Frequency of fractures on tool types.

Chapter 9

Ceramic Analysis: A Guide to Identification of Cultural Affiliation

Brad R. Logan

Introduction

Archaeological testing of 14 of the 28 sites investigated by Kaw Valley Engineering resulted in the recovery of 1,533 ceramic artifacts. Review of artifact collections curated at the Department of Anthropology of the University of Nebraska in Lincoln resulted in the discovery of a sample of 77 potsherds found on the surface at 25HN12 by that institution in 1951. That sample was borrowed for analysis in order to augment the small sample of ceramics recovered at the site during the 1985 excavations. Therefore, the ceramic analysis described here is based on the review of a grand total of 1,615 artifacts of which 44 (2.7%) are rim sherds and 1,571 (97.3%) are body sherds (Tables 84 and 85).

Most of the sherds in the total sample are fragments too small for meaningful analysis. That is, the interior and exterior surfaces of these sherds have been too reduced by breakage or erosion to permit unqualified determination of such attributes as surface treatment, method of finishing, and presence or absence of smoothing. Analysis focused on sherds that had any single surface dimension equal to or greater than two centimeters. This criterion reduced the sample for detailed analysis to 31 (70.5%) of the rim sherds and 299 (19.0%) of the body sherds, or 330 (20.4%) of the original total.

This sample is too small to permit any sophisticated analysis of the ceramic technology of the prehistoric inhabitants of the Harlan County Lake area. However, the samples are valuable in that they provide a means of identifying the cultural affiliation of some of the sites' inhabitants. The discussion in this chapter focuses on this aspect of the ceramic assemblage. The discussion is based on a comparison of several attributes of the ceramic artifacts to those described by previous researchers who have conducted investigations in the Central Plains. Attributes selected for their usefulness in determining the cultural affiliation of the ceramists include eleven discrete and six continuous variables. Discrete variables are: temper, color of slip (if present), color of exterior paste, color of interior paste, presence or absence of carbon streak, type

Table 84

Rim Sherd Count by Site and Provenience

site number	unit/level	number analyzed	number unanalyzed
25HN5	7 / 10-20	1	0
	7 / 40-60	2	1
	8 / 20-30	2	0
	8 / 40-60	0	1
	8 / 60-70	1	0
	9 / 0-20	1	0
	9 / 20-30	1	0
Total		8	2
25HN12	surface (UNL)	7	0
Total		7	0
25HN36	3 / 10-20	2 (same sherd)	0
	3 /20-30	1	0
	5 / 10-20	2	0
	5 / 20-30	0	1
	5 / 70-80	0	1
Total		5	2
25HN37	beach	8	4
Total		8	4
25HN39	4 / 20-30	0	1
Total		0	1
25HN42	5 / 10-20	0	1
Total		0	1
25HN52	surface	2	3
Total		2	3
25HN57	beach	1	0
Total		1	0
TOTALS (percent)		31 (70.5%)	13 (29.5%)

UNL : University of Nebraska, Lincoln

Table 85

Body Sherd Frequency by Site and Provenience

site number	unit/level	number analyzed	number unanalyzed
25HN5	4 / 0-10	0	2
	5 / 10-20	2	3
	5 / 20-30	0	6
	5 / 30-40	0	2
	6 / 0-10	2	12
	6 / 10-20	13	27
	6 / 20-30	2	9
	6 / 30-40	2	3
	6 / 40-50	0	1
	7 / 0-10	0	23
	7 / 10-20	2	17
	7 / 20-30	8	16
	7 / 30-40	3	20
	7 / 40-60	4	20
	7 / 60-70	1	13
	7 / 70-80	0	5
	7 / 80-90	2	11
	7 / 90-100	1	5
	8 / 0-10	2	11
	8 / 10-20	2	16
	8 / 20-30	4	15
	8 / 30-40	6	11
	8 / 40-60	7	17
	8 / 60-70	2	8
	8 / 70-80	3	15
	8 / 80-90	3	10
	8 / 90-100	3	14
	8 / 100-120	4	12
	8 / 120-140	2	8*
	9 / 0-10	4	45
	9 / 10-20	6	30
	9 / 20-30	19	29
	9 / 30-40	0	3
	9 / 40-50	2	1
Total		111	440
25HN12	surface	2	2
	surface (UNL)	33	37
	Feature 1	2	0
	2 / 0-17	0	1
	4 / 0-15	1	3
	5 / 0-15	0	2
Total		38	45

Table 85 cont.

site number	unit/level	number analyzed	number unanalyzed
25HN31	beach, cut bank	5	1
	1 / 0-10	0	3
	1 / 10-20	1	0
	2 / 20-30	0	1
	2 / 30-40	0	1
	3 / 50-50	0	1
	4 / 20-30	0	1
	6 / 0-10	0	1
	6 / 10-20	0	1
Total		6	10
25HN36	3 / 0-10	2	26
	3 / 10-20	2	28
	3 / 20-30	4	8
	3 / 30-40	1	2
	3 / 40-50	1	5
	3 / 50-60	0	1
	3 / 60-70	0	1
	4 / 0-10	3	22
	4 / 10-20	4	28
	4 / 20-30	3	8
	4 / 30-40	2	4
	5 / 0-10	1	39
	5 / 10-20	3	28
	5 / 20-30	1	24***
	5 / 30-40	0	2
	5 / 50-60	0	3
	5 / 60-70	0	2
	5 / 70-80	2	1
	6 / 0-10	3	32
	6 / 10-20	0	23
	6 / 20-30	0	11
	6 / 30-40	2	10
Total		34	308
25HN37	beach	61	159***
	Feature 1 (23 cm)	2	1
	1 / 0-10	0	1
	1 / 10-20	0	20
	1 / 20-30	3	4
	2 / 10-20	0	1
	3 / 0-10	0	4

Table 85 cont.

site number	unit/level	number analyzed	number unanalyzed
	3 / 10-20	0	5
	4 / 0-10	0	4
	5 / 0-10	0	2
Total		66	201
25HN39	3 / 0-10	0	5
	3 / 10-20	1	17
	3 / 20-30	0	3
	4 / 0-10	2	0
	4 / 10-20	1	8
	4 / 20-30	0	8
	4 / 30-40	1	1
	5 / 0-10	0	7
	5 / 20-30	1	0
	6 / 0-10	0	16
Total		6	65
25HN40	surface	0	1
	1 / 0-10	0	2
	1 / 30-40	1	0
	1 / 10-20	1	0
	2 / 0-10	0	1
	2 / 20-30	1	1
Total		3	5
25HN42	2 / 0-10	0	4
	2 / 10-20	0	4
	3 / 0-10	1	5
	3 / 10-20	0	3
	3 / 20-30	0	1
	4 / 0-10	1	12
	5 / 0-10	0	5
	5 / 10-20	0	2
	5 / 20-30	0	2
	5 / 30-40	0	2
	5 / 40-50	0	1
	5 / 50-60	0	4
	5 / 60-70	0	4
Total		2	49
25HN51	1 / 0-10	0	2
	2 / 0-10	0	10
	3 / 0-10	1	22

Table 85 cont.

site number	unit/level	number analyzed	number unanalyzed
	3 / 10-20	0	6
	4 / 0-10	2	19
	4 / 10-20	0	3
Total		3	62
25HN52	surface	20	69
Total		20	69
25HN54	beach	2	0
Total		2	0
25HN57	2 / 0-10	0	2****
	3 / 0-12	0	2
	4 / 0-12	0	1****
	4 / 0-12	0	3
Total		0	8
25HN60	5 / 0-30	0	1
	6 / 0-30	1	0
Total		1	1
25HN125	1 / 30-40	0	1
	1 / 40-50	0	1
	2 / 20-3C	0	3
	2 / 30-40	2	4
Total		2	9
TOTALS (percent)		299 (19.0%)	1,272 (81.0%)
TOTAL (body sherds)			1,571
GRAND TOTALS (percent)		330 (20.4%)	1,285 (79.6%)
GRAND TOTAL (all sherds)			1,615

* includes one historic white glassware
*** includes one daub
**** historic whiteware

UNL University of Nebraska, Lincoln

Table 86

Discrete Attribute Variable Key for Ceramics

Temper

1. Indeterminate
2. Absent
3. Fiber
4. Sand
5. Grit (unidentified crushed rock)
6. Sherd
7. Limestone
8. Bone
9. Shell
10. Crushed granite
11. Crushed calcite
12. Grit and sand
13. Hematite
14. Sand and sherd
15. Grit and shell
16. Indurated clay
17. Sand and clay
18. Grit and limestone
19. Sand and calcite
20. Sand and shell

Color of slip, exterior paste, interior paste, and core*

1. 7.5YR 7/4, pink
2. 7.5YR 6/4, light brown
3. 7.5YR 5/0, gray
4. 7.5YR 4/0, dark gray
5. 7.5YR 3/0, very dark gray
6. 7.5YR 2/0, black
7. 10YR 8/6, yellow
8. 10YR 7/3-4, 8/3-4, very pale brown
9. 10YR 6/3, pale brown
10. 10YR 5/2, grayish brown
11. 10YR 4/1, dark gray
12. 10YR 3/1, very dark gray
13. 10YR 2/1, black
14. Indeterminate
15. 7.5YR 5/8, strong brown
16. 10YR 6/1, gray
17. 10YR 6/1, gray
18. 7.5YR 5/2, brown
19. 10YR 5/1, gray
20. 10YR 7/1, light gray
21. 10YR 6/4, light yellowish brown
22. 10YR 8/1-2, white
23. 10YR 6/6, brownish yellow
24. 10YR 7/2, light gray
25. 5Y 7/1, light gray
26. 10YR 5/3, brown
27. 10YR 4/2, dark grayish brown
28. 7.5YR 6/0, gray
29. 10YR 3/2, very dark grayish brown
30. 10YR 4/3, brown/dark brown
31. 10YR 5/4, yellowish brown
32. 5YR 6/6-8, reddish yellow
33. 2.5YR 5/6, red
34. 7.5YR 7/0, light gray

Carbon Streak

1. Indeterminate
2. Absent
3. Present

Table 86 cont.

Finishing

1. Indeterminate
2. Paddle-and-anvil
3. Scraped

Exterior surface treatment, Interior surface treatment

1. Indeterminate
2. Floated
3. Polished
4. Slipped
5. Slipped and polished
6. Cordmarked
7. Brushed
8. Simple stamped
9. Check stamped
10. Cordmarked and slipped
11. Slipped and cordmarked
12. Smoothing with a firm smooth tools
13. Knotted and cordmarked
14. Cordmarked and polished

Smoothing over Exterior and Interior surface treatment

1. Indeterminate
2. Absent
3. Present

* Based on Munsell Soil Color Charts, 1975 edition.

of finishing technique, type of exterior and interior surface treatment, and presence or absence of smoothing over exterior and interior surface treatment. Continuous variables are: body thickness, shoulder thickness, rim thickness, rim height, rim diameter, and lip thickness. In addition, remarks were recorded regarding such distinctive attributes on some sherds as the type of decorative treatment, direction of rim curvature (if any; e.g., incurvate or excurvate), lip form (rounded, flat, etc.), presence of collar, cord width, maximum grain size of coarse sand temper, presence of fire clouds, natural inclusions, surface exfoliation, or presence of any organic remains on the interior surface.

Temper was examined on clean breaks of the sherd core with a 10X hand lens. Color of slip, exterior paste and interior paste were determined by comparison of the most prevalent suface color with Munsell Soil Color Charts (1975 edition). Thicknesses of sherds were measured with a sliding rule caliper to the nearest millimeter. Rim diameter was measured to the nearest centimeter on a circle key, if sufficient arc length was preserved. An attribute key for interpretation of discrete variables is presented in Table 86.

Discussion

The ceramic assemblages examined here represent four distinct wares from three temporal periods: Plains Woodland, Plains Village and Proto-historic. Discussion of the assemblages is best made with reference to previous investigations of the regional, cultural representatives of these time periods. These are the Keith (Plains Woodland), Upper Republican (Plains Village), and Dismal River and White Rock (Proto-historic) complexes, respectively. Sites with ceramic assemblages indicative of these complexes are identified in Table 87.

<u>Keith Complex</u>

The diagnostic ceramic ware of the Keith complex of the Plains Woodland period has been defined by Kivett (1953:131-134) as Harlan Cord-Roughened. Sherds of this ware represent the characteristic Plains Woodland vessel, that is, a large sack-shaped container with a wide mouth and conoidal base. This ware is described as "finely cord roughened with the impressions usually extending vertically and parallel" (Kivett 1949:282). The exterior color is generally dark gray but ranges to buff and fire-blackened. Sherds "tend to split and crumble" (Kivett 1949:282). Most characteristic of the ware is the presence of calcite temper and its thickness (9-13 mm). It is described as lacking rim decoration (Kivett 1949, 1953).

Table 87

Cultural Affiliation of Investigated Sites Based on Recovered Ceramic Artifacts

site number	*suggested cultural affiliation
25HN5	Upper Republican
25HN12	**Keith, Upper Republican
25HN31	Upper Republican
25HN36	Upper Republican
25HN37	Dismal River
25HN39	White Rock
25HN40	Keith (?), Upper Republican
25HN42	Upper Republican
25HN51	Upper Republican
25HN52	Upper Republican
25HN54	Upper Republican
25HN55	Upper Republican
25HN60	Upper Republican
25HN125	Keith

* Some of the suggested cultural affiliations are based on small sample sizes (Tables 84 and 85) and are, therefore, tentative.

** Upper Republican component based on sherds recovered by the University of Nebraska in 1951.

Dunnell (1971:45) suggests the use of "significata", or specific criteria necessary and sufficient for defining the boundaries of classes in archaeological systematics. In this sense, tempering of Harlan Cord-Roughened vessels with crushed calcite is the "significatum" of this ware (Kivett 1953:133-134). According to Kivett (1955:118-119), "calcite crystals are found in various shales which are exposed along the Republican River and can be freely extracted on the weathered slopes". Leaching of the crystals from the sherds may result from their exposure on the surface or to high soil acidity. In such cases, sherds may lack the calcite temper but retain distinctive holes that reflect their former presence.

Sherds of the Harlan Cord-Roughened ware were found at three sites during the Harlan County Lake project. These include a single sherd from 25HN40, one sherd (cross-mended from two finds) from 25HN125, and five from 25HN12. Two of the last mentioned are large body sherds from feature 1. The small sample of Keith complex ceramics from 25HN12 was augmented with 24 sherds from the 1951 collection by the University of Nebraska. Such small samples of pottery are not unusual at sites of the Keith complex (Kivett 1949; Wedel 1986:85). The sherds were all identified as Harlan Cord-Roughened ware by the presence of all-over cordmarking and, most importantly, crushed calcite temper. The carbonate nature of this material was confirmed by testing crystals of the temper in each sherd with a dilute solution of hydorchloric acid. In each, the crystals reacted to the solution.

The exterior surface of the 29 sherds from 25HN12 generally ranges in color from very pale brown to gray, although a single sherd of the type has a white surface color. Interior surfaces possess a similar color range. There is no evidence of the use of a slip over the exterior or interior surfaces. Cordmarking is generally vertical. Exterior smoothing was recorded on only one sherd and it was not pervasive. Interior smoothing was evident in all cases. A single sherd had both sand and calcite added as tempering agents, although the former may be a natural inclusion. The only other such inclusion, again recorded in only one sherd, is hematite.

Thickness of Harlan Cord-Roughened sherds may well serve as a second "significatum", at least in distinguishing this ware from those of latter cultural complexes in the region. This has been demonstrated statistically with a similar Woodland (Grenwood complex) ware when compared to a later, Plains Village (Pomona complex) pottery at a multi-component site in eastern Kansas (Logan 1979). Since ceramic artifacts collected at the site in 1951 include at least two distinct wares, 25HN12 would have presented a similar case for statistical comparison had the sample been larger. Eleven sherds from the 1951 collection are tempered with crushed sherds, three have sand temper, and a single sherd appears to lack any tempering agent. Other attributes of these sherds suggest a later (Upper Republican?) occupation of the site (see below). The thickness of the body sherds of this ware ranges from 4 to 9 mm with a mean of 6 mm. The thickness of the body sherds indicative of a Keith complex occupation, however, ranges from 6 to 14 mm with a mean of 9 mm. Given a larger sample of both wares, it is likely that a comparison of means using a statistic, such as the t-test, would have demonstrated the reliability of body thickness as a significatum. That sherds of the Harlan Cord-Roughened ware do tend to split along a plane parallel to the interior and exterior surfaces is evidenced by one of the sherds from Feature 1 at 25HN12, where this process has commenced, and the large cross-mended sherd from 25HN125, where a 4 mm thick portion of the interior surface has exfoliated and is all that remains.

Rim treatment of Harlan Cord-Roughened ware is represented by three sherds, all from the University of Nebraska collection at 25HN12 (Plate 16 a-c). These compare in most respects with those described by Kivett (1949, 1953), in that they came from thick, straight-walled vessels with wide mouths and flat lips. Of interst here is the fact that two of these specimens (Plate 16 a-b) show decorative treatment comparable to that characteristic of Valley Cord-Roughened ware, the diagnostic pottery of the contemporary Valley complex of the Plains Woodland. This treatment consists of closely spaced punctates located from 7 to 22 mm from the lip of the vessel (cf. Hill and Kivett 1941:176). In addition, one specimen (Plate 16 b) also bears a cord impressed lip. Harlan Cord-Roughened ware is described as lacking decoration like that of the punctates, bosses, cordwrapped rod impression, or lip decorations of Valley Cord-Roughened ware (Kivett 1949, 1953; Wedel 1959:552; cf. Hill and Kivett 1941). However, the geographical distribution of the latter overlaps that of the Keith complex in western Nebraska and both wares have been found associated at some sites in the Central Plains (Kivett 1953; Johnson, in press). Indeed, Kivett (1953:137) has suggested that the Valley complex may reflect a later manifestation resulting from "a Hopewellian [i.e., Kansas City Hopewell] influence on a simple Woodland complex such as the Keith focus". It is suggested that the decorative treatment of the Harlan Cord-Roughened sherds from 25HN12 reflects an association of the two complexes in the Harlan

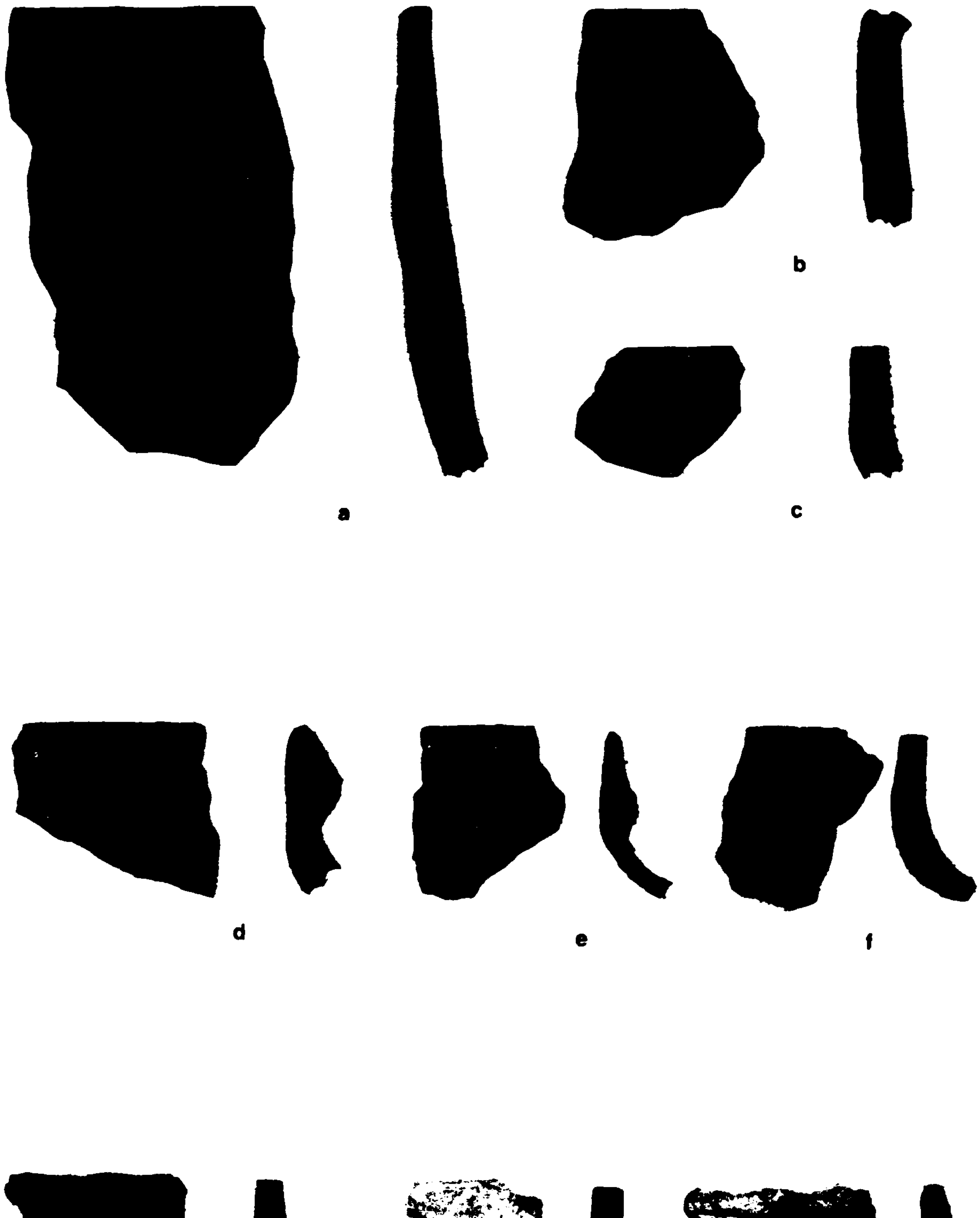


Plate 16. Rim sherds from 25HN5 and 25HN12: a) 25HN12 UNL122; b) 25HN12 UNL76; c) 25HN12 UNL78; d) 25HN585342; e) 25HN585198; f) 25HN585075; h) 25HN585286; i) 25HN585.

County Lake area at the time indicated by the radiocarbon dates from Feature 1 at that site (i.e., A.D. 700.110 [UGa 5478], A.D. 900.70 [UGa 5482], and A.D. 730.55 [DIC-3325]). Given the small sample of sherds from the site, this suggested association must be considered tentative. Further investigations in the study area may provide the additional data necessary to support the relationship and to clarify its nature.

Upper Republican Complex

The Upper Republican complex of the Plains Village period is represented at 11 sites in the study area (Table 87) by the presence of distinctive pottery described by Kivett (1949) and Wedel (1935, 1959, 1986), from other sites of this complex in western Nebraska and Kansas. The typical vessel shape is a globular jar with rounded bottom and shoulder. Two styles of rim treatment are described, including unthickened, vertical or slightly flared forms and collared forms, the latter being the most common. Collars generally were decorated with trailed or incised lines that were oriented horizontally and parallel or in a variety of combined horizontal and diagnonal direction. Uncollared rims were generally left undecorated "except for the occasional occurrence of small diagonal incised elements on the lip" (Kivett 1949:280).

Exterior and interior surface treatment was the result of the paddle-and-anvil technique. Both smoothed over and all-over cordmarked exterior surfaces occur. Cordmarks on Upper Republican vessels "are usually finer and often less deeply impressed than those [of] the earlier Woodland culture" (Wedel 1986:107). These marks were sometimes partly smoothed during the pre-firing stage of production in a manner that left them with a slightly polished appearance (Kivett 1949:280). Cordmarks may run vertically or in a criss-cross pattern. Another distinguishing characteristic between Upper Republican and Woodland (Keith complex) pottery is the presence of sand temper in the former. The sand particles range from fine to coarse (0.5 to 4.0 mm; Wedel 1959:398). Shell temper occurs in some sherds but is uncommon. Vessel walls are also thinner in Upper Republican pots than in those of the Plains Woodland complexes, as discussed above with reference to the ceramics from 25HN12. The body thickness of sherds may range from 2.5 to 7.5 mm at some sites, such as the Pottorff site in Lane County, Kansas (Wedel 1959:398). At Upper Republican sites in the Medicine Creek Reservoir, southcentral Nebraska, most of the pottery sherds were from 4 to 6 mm thick (Kivett 1949:279). Finally, another contrast between the ceramics of the Upper Republican and Plains Woodland complexes in the Central Plains is their greater abundance at sites of the later complex (Wedel 1986:85, 106). Kivett (1949:283) has suggested that this difference reflects "a more permanent occupancy in Upper Republican than in Woodland times".

The Upper Republican complex is represented at eight of the tested sites in the Harlan County Lake area by less than a dozen analyzable sherds. Six of the sites, 25HN31, 25HN40, 25HN42, 25HN51, 25HN54 and 25HN60, will not be discussed in detail in this section. Some of the sherds from 25HN12 have attributes indicative of this complex in combination with others that have not been described for Upper Republican pottery. Because of the anomalous nature of these sherds, this small sample will be discussed below. The suggested cultural affiliation of an Upper Republican component at these sites must be considered as tentative. The samples of the Plains Village ceramic assemblages from sites 25HN5, 25HN36 and 25HN52, however, are of sufficient size to warrant further discussion.

The Upper Republican affiliation of the Graham Ossuary (25HN5), previously identified by Strong (1935:103-114), is well represented in the recovered ceramic assemblage of 119 analyzable sherds. This sample includes 8 rims and 111 body sherds, all but two of which were found in excavation units 6-9. The ceramic artifacts from Graham Ossuary compare in all respects with those described by Strong (1935:108) from his prior excavations at the site. Rim sherds include both collared and unthickened forms (Plate 16 d-i). On one of the two collared rims, the prominent fillet has been slightly pinched (Plate 16 d). The second rim has been only slightly thickened to form a low-relief collar that is without any decoration (Plate 16 e). Another small rim sherd has been smoothed over and incised with opposing diagonal lines that form a diamond shape (Plate 16 h). This motif is found on collared rims from Graham Ossuary recovered by Strong (1935: Plate 9) but it is not possible to determine if this small sherd is from a similar vessel.

Strong (1935:248: Table 5) describes six such cases of this motif on collared rims and none on unthickened rims. In two of the unthickened forms, the rim rises vertically from a constricted neck at almost a right angle to the shoulder. In both cases, the rims lack any decorative treatment and bear slightly smoothed traces of cordmarks (Plate 16 f-g). One rim has parallel trailed lines horizontal to the lip, which bears diagonally trailed lines (Plate 16 i). It is not possible to determine whether or not this sherd is from a collared or unthickened rim. Only two rim sherds had sufficient arc to provide an estimate of the diameter of the vessel mouth. One of these is that last described, which had a mouth diameter of approximately 8 cm, and the other is the collared rim with the pinched fillet, which came from a wider mouthed vessel (ca. 12 cm).

The body sherds appear to be relatively monotypic. The exterior surface is usually cordmarked and in only 32 cases (28.8%) was this surface smoothed over. Cord width, on a sample of 22 sherds on which this attribute was measured, ranged from about 0.5 to 2.5 mm with a mean of 1.0 mm. No evidence of an external slip was noted on any specimen. The interior surface was, in all but one case, smoothed and floated. The exterior surface color ranged from very pale brown to brown and from light brownish gray to black. However, the last extreme is represented by only three sherds and the majority (67 or 60.4%) fall within the various shades of gray. Interior surfaces are similar. Core color is generally dark gray to very dark gray. A carbon streak is generally present, indicative of a low firing temperature. This attribute is characteristic of nearly all Central Plains ceramics. Body thickness ranged from 2 to 8 mm with a mean of 4.6 mm. Sand was by far the most prevalent temper, occurring in 97 specimens (87.3%) as the sole aplastic agent. It also occurred in combination with crushed sherd in two cases and with indurated clay in one other. Shell temper was found in only 9 specimens (8.1%) and sherd temper occurred singly in only one case.

At 25HN36, an Upper Republican village, the ceramic assemblage is comparable in most respects to that from Graham Ossuary. Although it is much smaller, being represented by only 39 analyzable fragments (5 rims and 34 body sherds), the attributes are, in nearly every case, like those from the site just described. Seven rim sherds were found during the test excavations at this site and three of these (one is a cross-mend of two specimens) are presented here (Plate 17 a-c). The mended sherds are a smoothed-over, vertical form with a rounded lip, the exterior portion of which bears shallow indentations about 3 mm long oriented vertically every 5 mm around the rim (Plate 17 a). A second vertical form was horizontally trailed over a cordmarked surface, apparently while the vessel was in a leather-hard state. The outside of the flattened lip bears shallow, diagonally oriented incisions about 10 mm apart (Plate 17 b). The third rim sherd may have come from a bowl, a vessel form uncommon in the Upper Republican material culture (Wedel 1986:106). This specimen is incurvate, with a rounded lip that bears a single stick impression (Plate 17 c). Of these rims only one, the cross-mended case first described, had sufficient arc to permit an estimate of mouth diameter. It came from a vessel with a mouth of approximately 12 cm diameter.

Plate 17. Rim sherds: a) 25HN3685001-002; b) 25HN3685141; c) 25HN3685125; d) 25HN5285019; e) 25HN5285009; f) 25HN12 UNL80; g) 25HN12 UNL79; h) 25HN12 UNL77; i) 25HN3785028; j) 25HN3785036; k) 25HN3785047.

Of the 34 analyzed body sherds, 18 (52.9%) are sand tempered, five have been tempered with crushed sherd, and nine have both sherd and sand temper. The thickness ranges from 3 to 9 mm with a mean of 5.4 mm. The exterior paste color ranges from pale brown to very dark grayish brown and gray to very dark gray with a single case of pink. Interior colors also fall within the same spectrum. Core color and carbon streak are similar to the material from 25HN5. Exterior surfaces have been cordmarked in 27 cases (79.5%), with all others either indeterminate or smoothed over. Interior surfaces have generally been smoothed and floated (26 cases or 76.4%), however, in four cases this surface has been brushed, in one it has been slipped, and in another it has been both slipped and polished.

At 25HN52, the Upper Republican complex is represented by 22 analyzed sherds, including two rims and 20 body fragments. The rims are both collared forms (Plate 17 d-e). One has been slightly pinched or indented and bears horizontal trailings (Plate 17 d) and the other, also similarly indented, has diagonal incisions on the lip (Plate 17 e). Neither of these sherds is large enough to provide an estimate of mouth diameter.

Of the 20 body sherds, 19 have sand temper and the sole exception has been tempered with crushed sherd. The body thickness ranges from 3 to 9 mm with a mean of 5.8 mm. An external slip was recorded on one specimen and it was light brownish gray in color. The exterior surface color falls within the same gray and brown spectrum as the other Upper Republican assemblages discussed above. Half of the specimens were recorded as having an external color of very pale brown. Interior surface colors fell within the same range. Exterior surfaces were cordmarked in 16 cases, smoothed and floated in two, slipped and cordmarked in one, and smoothed with a firm smooth tool in a single specimen. Interior surfaces included 18 that had been smoothed and floated, one that had been slipped, and one sherd on which this attribute could not be determined. The exterior surface was smoothed over on only five sherds but the interior surfaces were invariably smoothed.

An Upper Republican occupation of 25HN12 may be indicated by the small sample (n-14) of sherds that contain sand or sherd temper. All of these sherds were collected by the University of Nebraska in 1951. They include three rims and 11 body fragments. Two of the rims (Plate 17 f-g) are particularly notable for their extreme thickness and sherd temper. Only their decorative treatment suggests an Upper Republican affiliation. This consists of horizontally trailed lines on a collar. Although pieces of crushed sherd could be seen in the sherds, some other tempering agent (shell?) appears to have leached away. This may account for the noteworthy lightweight of these sherds. Given their extreme thickness, one would have expected them to be more dense. Even the exterior surface color of these sherds is somewhat distinguishable from the run-of-the-mill Upper Republican ware. One is brown (10YR 5/3) and the other is brownish yellow (10YR 6/6). The former color was recorded on only a single sherd from 25HN60 and the latter color was not represented at any of the other Plains Village sites tested by Kaw Valley Engineering. Both sherds are 11 mm thick. The third rim sherd is more characteristic of Upper Republican vessels in that it has been tempered with sand, is very pale brown in color, 8 mm thick, and has been decorated with horizontally trailed lines (Plate 17 h).

With the exception of sherd temper, which occurs in 9 cases, all other attributes of the body sherds in this collection fall within the range of Upper Republican ware. Given the small sample of this material from 25HN12, nothing conclusive can be stated about the cultural affiliation represented. It is possible that the sherds represent a complex distinct from Upper Republican. However, it is suggested that at the present time, the ceramic assemblage may be considered a different form (phase?) of the Upper Republican complex.

Dismal River Complex

Gunnerson (1960:160-166, 246-247) notes the pottery is the most diagnostic artifact of the Dismal River complex and bases his description of this ware on the large sample of material recovered from White Cat Village (25HN37). His description follows that of Metcalf (1949), who established three types, two on the basis of exterior surface treatment (Lovitt Plain and Lovitt Simple Stamped) and one on the basis of temper (Lovitt Mica Tempered). The reliability of these types is questionable since some restored vessels have areas of both plain and simple stamped surface treatment.

The temper used in Dismal River ceramics consists of abundant fine sand, which Gunnerson (1960:161) suggests may have been a natural inclusion in the clay selected for the paste. Mica particles also occur in some sherds in association with sand temper. Dismal River pottery generally breaks along straight lines forming small square to rectangular pieces. The texture of the paste is fine and compact. Body thickness averages 6.3 mm. Exterior and interior surface color ranges from buff through gray to black, although "the majority are dark gray" (Gunnerson 1960:162).

Surface treatment serves as a distinguishing significatum between Proto-historic ceramics, including Dismal River and White Rock pottery (see below), and those of the preceeding Plains Woodland and Plains Village periods (Rusco 1960:42). Sherds of the Proto-historic complexes exhibit exterior surfaces that are either smoothed over or that have traces, in the form of parallel ridges, of simple stamping (Gunnerson 1960:163; Rusco 1960:30). Sherds of the Plains Woodland and Plains Village complexes in the study area were either smoothed over or cordmarked.

Dismal River ceramics rarely show any surface decoration and when it occurs it is generally confined to the lip. Lip treatment includes both rounded and flattened forms, with examples of the latter being flared in, out, or both. No vessels have been restored from the ceramic assemblage of White Cat Village, however some restored vessels from the Lovitt site (25CH1) provide examples of the shape of Dismal River pottery. These are globular to elongate in shape with constricted necks. Rims are straight to slightly flaring. Other forms are indicated by sherds, including bowls, flat bottomed vessels, and miniatures (Gunnerson 1960:247).

The ceramic assemblage recovered during the test excavations at White Cat Village by Kaw Valley Engineering consists of 74 analyzable sherds, including 8 rims and 66 body fragments. Nearly all of this material was found on the beach. It is singularly monotypic, showing little variation in any of the attributes recorded. Temper consists of fine grained sand in all but two cases, the latter including a single sherd with shell temper and another with sand and crushed sherd. Body thickness ranges from 2 to 10 mm with a mean of 5.8 mm. No slip was present on any sherd. Exterior and interior surfaces ranged in color from pale brown or light yellowish brown to very dark grayish brown and from light to dark gray. Sherds exhibited light gray exterior surfaces in 20 cases (31.2%) and dark gray in 17 cases (26.6%). Interior surface color had a similar range with dark gray to very dark gray predominating (45 cases or 70.3%). A single sherd had an interior surface color of reddish yellow (5YR 6/6-8). Core color was generally a very dark gray (43 cases or 67.2%).

Exterior surfaces were generally smoothed and floated (37 of 57 determinable cases or 64.9%). A total of 19 specimens (33.3%) showed traces of simple stamping in the form of ridges that had not been obliterated during the smoothing process. Only a single sherd showed evidence of cordmarking. Interior surfaces were smoothed and floated in 58 (87.9%) of the body sherds examined. Smoothing over the exterior surface treatment was noted on 57 (89.4%) sherds.

Rim sherds from White Cat Village all fall within the Dismal River categories described by Gunnerson (1960) and Metcalf (1949). They are all undecorated. Those illustrated (Plate 17 i-k) are representative of those recovered. They are all vertical forms with flattened lips. In one case (Plate 17 j), the lip is flared outward. None of the recovered rim sherds were of sufficient size to provide an estimate of mouth diameter.

White Rock Complex

Rusco (1960:30-34) describes the pottery from 25HN39, one of the type sites of the White Rock complex, and assigns most of it to the Walnut Decorated Lip type. The small sample of pottery recovered at that site by Kaw Valley Engineering can be assigned to that type. This sample consists of one small rim fragment and six body sherds. The rim sherd is too small for analysis.

Sherds of the Walnut Decorated Lip pottery are tempered with moderate amounts of medium to coarse grained sand. Paste color is buff or gray with buff predominate and "a few sherds are light orange, probably as a result of accidental refiring" (Rusco 1960:30). Exterior surfaces are generally simple stamped and then smoothed over. Body thickness ranges from 2 to 8 mm and most of the sherds are 3 to 6 mm thick.

All six of the body sherds recovered at 25HN39 in 1985 are sand tempered. In density and grain size, this material is more comparable to Upper Republican ware than that of the Dismal River complex. Four of the sherds are 3 mm thick and two are 4 mm thick. The presence of a slip was recorded on one sherd and it was of a light yellowish brown color. Exterior surface colors of the sample are as follows: very pale brown (1), very dark gray (2), light yellowish brown (1), brownish yellow (1), and red (1). Interior surface colors are: dark gray (1), very dark gray (1), brownish yellow (1), reddish yellow (2), and red (1). Core color ranged from gray (1) to very dark gray (2) and brown (1) to brownish yellow (2). Exterior surfaces were generally smoothed over (4 cases), although traces of simple stamping were noted on one sherd. As a whole, this small sample is comparable to the Walnut Decorated Lip pottery recovered from this site in 1946 (Rusco 1960) and is indicative of the White Rock complex.

Conclusion

Although sample sizes for pottery recovered from sites during this project were generally small, they have yielded useful information regarding cultural affiliation (Table 87). They have also provided information regarding the degree of variability within individual assemblages and complexes. Results of these analyses have indicated the need to describe the variability present in site assemblages as opposed to providing only generalizations regarding ceramics. This information may be of value in the recognition of more regionally and temporally refined phases within presently defined complexes.

Chapter 10

Prehistoric Subsistence Strategies

Faunal Analyses

Marie E. Brown

Introduction

The total vertebrate faunal assemblage consists of 3,014 bone specimens, including teeth, recovered from 18 sites (Table 88). Of these, 2,354, or 78.1 percent, are from site 25HN36 (Table 88). Only 30.9 percent, or 933 specimens, of the total vertebrate faunal assemblage were identifiable (Table 89). Site 25HN36 yielded 25.5 percent of the total number of identified specimens (hereafter referred to as NISP) (Table 89). Although the majority of the vertebrate remains are from site 25HN36, the following discussion will examine the taxonomic composition of the combined vertebrate faunal assembage of the 16 sites with identifiable remains (Table 89). Specimens from two sites were not identifiable (Table 89). Known past and present distributions and the possible cultural significance of each identified taxon (Table 90) will be presented. This will be followed by a more detailed analysis of the assemblage from site 25HN36 (Table 92). A summary of elements representing each taxon with associated provenience for each site is provided in Appendix B.

In addition to the vertebrate fauna, 2,451 freshwater mussel shell fragments, weighing 769.9 grams were recovered from 12 sites (Table 91). A discussion of these remains will follow that for the vertebrate fauna.

Discussion of Identified Vertebrate Taxa

OSTEICHTHYES - BONY FISH

cf. _Scaphirhynchus platorynchus_ (?Shovel-nosed Sturgeon) - 25HN36: 1 specimen

Although the shovel-nosed sturgeon is more common in the Missouri and lower Kansas Rivers, it does occur in the Republican River in Kansas but diminished in abundance westward. Before spawning on rocky bottoms in swift water between April and June, sturgeons migrate upstream, entering tributaries in years when streams are high (Cross 1967:35). This may explain the occurrence of shovel-nosed sturgeon so far up the Republican River. It prefers "firm, shallow, sandy bottoms in channels where the current is strong" (Cross 1967:35). The majority of sturgeons are caught in

Table 88

Frequencies and Relative Percentages of Vertebrate Fauna Recovered From Sites

site	N1	percent of total vertebrate fauna
25HN5	2	0.0
25HN12	35	1.2
25HN16	7	0.2
25HN31	41	1.4
25HN32	2	0.0
25HN33	4	0.1
25HN36	2354	78.1
25HN37	243	8.1
25HN39	18	0.6
25HN40	78	2.6
25HN42	78	2.6
25HN50	6	0.2
25HN51	1	0.0
25HN54	25	0.8
25HN57	10	0.3
25HN61	5	0.2
25HN62	89	3.0
25HN125	16	0.5
TOTAL	3014	99.9

1 Number of specimens (i.e., fragments and complete bones and teeth)

Table 89

Frequencies and Relative Percentages of Fauna From All Sites

site	N1	NISP2	percent of total NISP	percent identifiable of total remains	percent identifiable per site
25HN5	2	2	0.2	0.0	100
25HN12	35	34	3.6	1.1	97
25HN16	7	4	0.4	0.1	57
25HN31	41	6	0.6	0.2	15
25HN32	2	0	0.0	0.0	0
25HN33	4	3	0.3	0.1	75
25HN36	2354	769	82.4	25.5	33
25HN37	243	54	5.8	1.8	22
25HN39	18	3	0.3	0.1	17
25HN40	78	12	1.3	0.4	15
25HN42	78	7	0.8	0.2	9
25HN50	6	3	0.3	0.1	50
25HN51	1	0	0.0	0.0	0
25HN54	25	8	0.9	0.2	32
25HN57	10	7	0.8	0.2	70
25HN61	5	5	0.5	0.1	100
25HN62	89	6	0.6	0.2	7
25HN125	16	10	1.1	0.3	63
TOTAL	3014	933	99.9	30.6	-

1 Number of specimens

2 Number of identified specimens

Table 90

Identified Vertebrate Taxa Recovered From the Harlan County Lake Project Area

taxon	common name	site
OSTEICHTHYES	BONY FISH	
Acipenseridae	Sturgeons	
cf. _Scaphirhynchus platorynchus_	?shovel-nosed sturgeon	25HN36
Lepisosteidae	Gars	
Lepisosteus sp.	Gar	25HN36
Cyprinidae	Minnows	
cf. _Cyprinus carpio_	?Carp	25HN57
Ictaluridae	Catfishes	
Ictalurus punctatus	Channel Catfish	25HN36
Ictalurus sp.	Catfish	25HN36
Percidae	Perches	
cf. _Stizostedion vitreum_	?Walleye	25HN57
Sciaenidae	Drums	
Aplodinotus grunniens	Freshwater Drum	25HN37
AMPHIBIA	AMPHIBIANS	
Ranidae	Frogs	25HN36
REPTILIA	REPTILES	
Chelydridae	Snapping Turtles	
Chelydra serpentina	Northern Snapping Turtle	25HN36
cf. _Chelydra serpentina_	?Northern Snapping Turtle	25HN36
Kinosternidae	Musk and Mud Turtles	
Kinosternon flavescens	Plains Yellow Mud Turtle	25HN36
cf. _Kinosternon flavescens_	?Plains Yellow Mud Turtle	25HN36

Table 90 cont.

taxon	common name	site
Emydidae	Freshwater and Marsh Turtles	
Terrapene ornata	Ornate Box Turtle	25HN36
cf. *Terrapene ornata*	?Ornate Box Turtle	25HN61
Chrysemys picta	Western Painted Turtle	25HN36
Trionychidae	Softshell Turtles	
Trionyx muticus	Midland Smooth Softshell Turtle	25HN36
Trionyx sp.	Softshell Turtle	25HN36
Colubridae	Non-venomous Snakes	25HN5
Elaphe absoleta	Black Rat Snake	25HN36
cf. *Elaphe absoleta*	?Black Rat Snake	25HN36
AVES	BIRDS	
Anatidae	Swans, Geese, Ducks	
Branta canadensis	Canada Goose	25HN36 25HN57
Chen caerulescens	Snow Goose	25HN54
cf. *Chen caerulescens*	?Snow Goose	25HN36
cf. *Anas acuta*	?Pintail	25HN36
Anas discors	Blue-winged Teal	25HN36
Anas clypeata	Northern Shoveler	25HN36
cf. *Anas clypeata*	?Northern Shoveler	25HN36
Anas sp.	Duck	25HN36
Lophodytes cucullatus	Hooded Merganser	25HN36
cf. *Lophodytes cucullatus*	?Hooded Merganser	25HN36
Accipitridae	Hawks, Eagles	
Buteo lagopus	Rough-legged Hawk	25HN36
cf. *Buteo lagopus*	?Rough-legged Hawk	25HN36
Tetraonidae	Grouse, Ptarmigan	
Pedioecetes phasianellus	Sharp-tailed Grouse	25HN12 25HN36
Rallidae	Rails, Gallinules, Coots	
Fulica americana	American Coot	25HN36
Columbidae	Pigeons, Doves	
Zenaidura macroura	Mourning Dove	25HN12
Passeriformes	Perching Birds	25HN36

Table 90 cont.

taxon	common name	site
MAMMALIA	MAMMALS	
Leporidae	Hares, Rabbits	
Sylvilagus sp.	Cottontail	25HN12 25HN36 25HN40
cf. *Sylvilagus* sp.	?Cottontail	25HN40
Lepus sp.	Jack Rabbit	25HN5 25HN36
cf. *Lepus* sp.	?Jack Rabbit	25HN36
Sciuridae	Squirrels	
Spermophilus tridecemlineatus	13-lined Ground Squirrel	25HN36
Cynomys ludovicianus	Black-tailed Prairie Dog	25HN36
Geomyidae	Pocket Gophers	
Geomys bursarius	Plains Pocket Gopher	25HN36 25HN40 25HN50 25HN125
Castoridae	Beavers	
Castoroides ohioensis	Giant Beaver	25HN16
Castor canadensis	Beaver	25HN36
Cricetidae	New World Rats and Mice	
Peromyscus sp.	White-footed Mice	25HN31
Microtus ochrogaster	Prairie Vole	25HN33 25HN36 25HN62
Ondatra zibethicus	Muskrat	25HN42
cf. *Ondatra zibethicus*	?Muskrat	25HN36
Canidae	Wolves, Coyotes, Dogs, Foxes	
Canis latrans	Coyote	25HN36
Canis cf. *latrans*	?Coyote	25HN36
Canis familiaris or C. *lupus*	Dog or Gray Wolf	25HN37
Vulpes velox	Swift Fox	25HN36
Procyonidae	Procyonids	
Procyon lotor	Raccoon	25HN36

Table 90 cont.

taxon	common name	site
Equidae	Horses	
Equus caballus	Domestic Horse	25HN37
Equus sp.	Horse	25HN31
Camelidae	Camels, Llamas	25HN16
Cervidae	Wapiti, Deer	
Cervus canadensis	Wapiti	25HN37
Odocoileus sp.	Deer	25HN31
		25HN36
		25HN37
		25HN39
		25HN125
cf. *Odocoileus* sp.	?Deer	25HN54
		25HN62
Antilocapridae	Pronghorn	
Antilocapra americana	Pronghorn	25HN36
		25HN40
cf. *Antilocapra americana*	Pronghorn	25HN40
Bovidae	Bison, Cows	
Bison bison	Bison	25HN36
		25HN37
		25HN57
Bison sp.	Bison	25HN16
		25HN54
Bison bison or *Bos taurus*	Bison or Domestic Cow	25HN40
Proboscidea	Mastodonts, Elephants	25HN54

Table 91

Taxonomic Composition of Freshwater Mussel Shells (Class: Pelecypoda) Recovered Within the Project Area

site and taxon	common name	N*	Wt.(g)
25HN5 (10.0 g)			
Indeterminate	-	30	10.0
25HN12 (29.6 g)			
Quadrula quadrula	Maple-Leaf Mussel	1	14.3
cf. _Quadrula quadrula_	?Pimple-Backed Mussel	1	5.0
Tritogeonia verrucosa	Buckhorn Mussel	1	2.9
Indeterminate	-	9	7.4
25HN16 (0.4)			
Inderminate	-	1	0.4
25HN31 (54.8 g)			
Quadrula quadrula	Maple-Leaf Mussel	2	44.5
Indeterminate	-	2	10.3
25HN36 (602.8 g)			
Quadrula quadrula	Maple-Leaf Mussel	7	53.4
Tritogonia verrucosa	Buckhorn Mussel	1	1.0
Uniomerus tetralasmus	Pond-Horn Mussel	1	2.3
Anodonta grandis	Floater Mussel	47	18.7
Lampsilis sp.	-	18	15.2
Indeterminate	-	2243	512.2
25HN37 (9.7 g)			
cf. _Quadrula_ sp.	-	1	2.2
Indeterminate	-	5	7.5
25HN40			
cf. _Ligumia recta latissima_	?Black Sand Mussel	1	7.8
Indeterminate	-	24	14.5
25HN42 (8.1 g)			
Indeterminate	-	42	8.1

Table 91 cont.

25HN54 (1.9 g)			
Indeterminate	-	1	1.9
25HN57 (9.0 g)			
Indeterminate	-	2	9.0
25HN60 (11.8 g)			
Indeterminate	-	6	11.8
25HN125 (9.5 g)			
cf. *Quadrula* sp.	-	1	1.6
Indeterminate	-	4	7.9
TOTAL		2451	769.9

* Number of fragments

Table 92

Taxonomic Composition of Vertebrate Remains From Site 25HN36

Taxon	common name	NISP	MNI
OSTEICHTHYES (NISP=55)	BONY FISH		
Acipenseridae	Sturgeons		
cf. *Scaphirhynchus platorynchus*	?shovel-nosed sturgeon	1	1
Lepisosteidae	Gars		
Lepisosteus sp.	Gar	2	1
Ictaluridae	Catfishes		
Ictalurus punctatus	Channel Catfish	2	1
Ictalurus sp.	Catfish	16	3
Unidentified fish		34	-
AMPHIBIA (NISP=1)	AMPHIBIANS		
Ranidae	Frogs	1	1
REPTILIA (NISP=267)	REPTILES		
Chelydridae	Snapping Turtles		
Chelydra serpentina	Northern Snapping Turtle	6	1
cf. *Chelydra serpentina*	?Northern Snapping Turtle	4	1
Kinosternidae	Musk and Mud Turtles		
Kinosternon flavescens	Plains Yellow Mud Turtle	2	1
cf. *Kinosternon flavescens*	Plains Yellow Mud Turtle	1	1
Emydidae	Freshwater and Marsh Turtles		
Terrapene ornata	Ornate Box Turtle	28	4
Chrysemys picta	Western Painted Turtle	11	1

Table 92 cont.

taxon	common name	NISP	MNI
Trionychidae	Softshell Turtles		
Trionyx muticus	Midland Smooth Softshell Turtle	2	2
Trionyx sp.	Softshell Turtle	33	3
Unidentified turtle		167	-
Colubridae	Non-venomous Snakes		
Elaphe obsoleta	Black Rat Snake	12	1
cf. *Elaphe obsoleta*	Black Rat Snake	1	-
AVES (NISP=49)	BIRDS		
Anatidae	Swans, Geese, Ducks		
Branta canadensis	Canada Goose	2	1
cf. *Chen caerulescens*	?Snow Goose	1	1
cf. *Anas acuta*	?Pintail	7	2
Anas discors	Blue-winged Teal	1	1
Anas clypeata	Northern Shoveler	2	2
cf. *Anas clypeata*	?Northern Shoveler	1	-
Anas sp.	Duck	4	-
Lophodytes cucullatus	Hooded Merganser	1	1
cf. *Lophodytes cucullatus*	?Hooded Merganser	1	-
Accipitridae	Hawks, Eagles		
Buteo lagopus	Rough-legged Hawk	1	1
cf. *Buteo lagopus*	?Rough-legged Hawk	1	-
Tetraonidae	Grouse, Ptarmigan		
Pedioecetes phasianellus	Sharp-tailed Grouse	1	1

Table 92 cont.

taxon	common name	NISP	MNI
Rallidae	Rails, Coots, Gallinules,		
Fulica americana	American Coot	1	1
Passeriformes	Perching Birds	1	1
Unidentified bird		24	-
MAMMALIA (NISP=397)	MAMMALS		
Leporidae	Hares, Rabbits		
Sylvilagus sp.	Cottontail	115	8
Lepus sp.	Jack Rabbit	17	2
cf. *Lepus* sp.	?Jack Rabbit	2	-
Sciuridae	Squirrels		
Spermophilus tridecemlineatus	13-line Ground Squirrel	1	1
Cynomys ludovicianus	Black-tailed Prairie Dog	4	2
Geomyidae	Pocket Gophers		
Geomys bursarius	Plains Pocket Gopher	19	2
Castoridae	Beavers		
Castor canadensis	Beaver	16	1
Cricetidae	New World Rats and Mice		
Microtus ochrogaster	Prairie Vole	7	4
cf. *Ondatra zibethicus*	?Muskrat	1	1
Unidentified rodent		4	-
Canidae	Wolves, Coyotes, Dogs, Foxes		
Canis latrans	Coyote	2	1
Canis cf. *latrans*	?Coyote	15	-
Vulpes velox	Swift Fox	4	1
Procyonidae	Procyonids		
Procyon lotor	Raccoon	2	1
Raccoon-size		11	-

Table 92 cont.

taxon	common name	NISP	MNI
Cervidae	Wapiti, Deer		
Odocoileus sp.	Deer	38	1
Antilocapridae	Pronghorn		
Antilocapra americana	Pronghorn	20	1
Deer or Pronghorn		53	-
Deer-size		60	-
Bovidae	Bison, Cows		
Bison bison	Bison	4	1
Wapiti or Bison		2	-
Indeterminate mammal (N=1585)			
TOTAL		769	61

trammel nets by commercial fisheries. Because sturgeons live near the bottoms of rivers and seldom take a hook (Cleland 1966:177), it is possible that sturgeons were caught prehistorically in nets and/or weirs and/or by spearing/harpooning.

Lepisosteus sp. (Gar) - 25HN36: 2 specimens

The specimens could not be assigned to species. Two species of gar, short-nosed gar (L. platostomus) and long-nosed gar (L. osseus), have been found in tributaries of the Republican River east of the project area. Whereas long-nosed gars prefer oxbows and the less turbulent areas of streams, such as quiet backwaters, short-nosed gars usually avoid these areas (Cross 1967:41, 44). Gars spawn in May and early June. The common occurrence of young gars in small streams rarely inhabited by adults suggests that gars migrate upstream prior to spawning (Cross 1967:44). The presence of gar within the faunal assemblage, therefore, may be the result of procurement during the migration and spawning of gars. Whereas gars live on the bottoms of deep pools in winter, "in summer gars inhabit surface-waters where aerial respiration supplements or replaces gill-breathing" (Cross 1967:44). At these times they are easily approached. Gars may have been caught in nets and/or by snagging. "The gar is quite often taken in gill nets as its long, beak-like mandibles are readily entangled" (Cleland 1966:172).

cf. Cyprinus carpio (?Carp) - 25HN57:1 specimen

Carp were introduced into the United States and probably became abundant in natural waters in Kansas and Nebraska in the 1890's or early 1900's. Today, its distribution is statewide in Kansas and probably in Nebraska, also. The presence of a single carp specimen in the first level of a test unit on site 25HN57 is probably intrusive. The site is situated on a beach that is subject to periodic inundation. In addition, the site is currently a favored fishing area and recent carcasses were observed on the surface of the site. Carp, consequently, will not be considered in subsequent faunal discussions.

Ictalurus punctatus (Channel Catfish) - 25HN36:2 specimens

Channel catfish are common throughout Kansas and Nebraska. Although their size varies greatly and they occasionally attain large sizes, channel catfish rarely exceed five pounds (Cross 1967:206). Adult channel catfish prefer cover in quiet water during daylight, moving into stronger, deeper riffles when feeding at night. Spawning occurs from late May to early July. Young channel catfish congregate in the shallow waters of rocky riffles from late June or July until autumn, leaving for deep water in winter. Progressively deeper water is occupied as the fish increase in size (Cross 1967:207). Prehistorically, young channel catfish may have been easy to trap in nets and/or to spear while in shallow water. Channel catfish may also have been caught on hooks.

Ictalurus sp. (Catfish) - 25HN36: 16 specimens

These specimens could not be assigned to species. In addition to channel catfish, the black bullhead (*I. melas*) also occurs within the project area. "The habitat of the black bullhead is characterized by soft bottoms and high turbidity, in quiet backwaters, oxbows, the mouths of creeks, and pools of small, intermittent streams. The species is not abundant in large streams where bottoms are rocky or sandy, nor in small streams that have a permanent flow of clear water" (Cross 1967:199). Prehistoric procurement methods postulated for channel catfish are suggested for the genus as a whole.

cf. *Stizostedion vitreum* (?Walleye) - 25HN57: 4 specimens

Walleyes are probably not indigenous to the project area. Harlan County Lake has been stocked with walleye (Corps of Engineers, Kansas City District 1985), an important game fish. Large impoundments, such as Harlan County Lake, are the most suitable habitats for walleyes. The presence of walleye bones in the first level of a test unit on site 25HN57 is probably intrusive. The site is situated on a beach that is subject to periodic inundation. In addition, the site location is currently a favored fishing area and recent fish carcasses were observed on the surface of the site. Walleye, therefore, will not be considered in subsequent faunal discussions.

Aplodinotus grunniens (Freshwater Drum) - 25HN37: 1 specimen

Currently, drum are present in the Republican River of Kansas, in the reservoirs of western and central Kansas (Cross 1967:325) and in Harlan County Lake. Drum may have occurred within the project area prehistorically. Drum are bottom dwellers, preferring muddy or sandy bottoms in shallow water. They spawn in spring (Cleland 1966:175). The presence of a single drum element within the first level of a test unit on site 25HN37 (White Cat Village) is probably intrusive. The site is currently a favored camping and fishing area. Fish carcasses were observed on the beach below the site. The close proximity of the test unit to the cut bank suggests that fish may have been cleaned in the vicinity of the test unit. In addition, White Cat Village is a Dismal River Plains Apache site that was extensively excavated in the 1940's and 1950's (Champe 1949; Gunnerson 1960). No fish remains had been recovered previously. "The absence of fish bones is interesting in the light of the Athabascan taboo against eating fish and in view of the probable abundance of fish in the streams near the villages" (Gunnerson 1960:245).

AMPHIBIA - AMPHIBIANS

Ranidae (Frogs) - 25HN36: 1 specimen

This element could not be assigned to species on the basis of morphological features. Based on the size of the element, it must be either a bullfrog (Rana catesbeiana) or a Plains leopard frog (R. pipiens). These species are found throughout Nebraska (Hudson 1942). The bullfrog is "restricted to permanent lakes, rivers, streams and swamps where deep water is available" (Collins 1974:71). The Plains leopard frog is found in a variety of aquatic habitats and is capable of wandering great distances from water (Collins 1974:78).

If the specimen is a bullfrog, its occurrence within the midden is probably the result of cultural factors. Although the Plains leopard frog may travel great distances from water, bullfrogs are restricted to aquatic habitats. Both frogs hibernate in the mud at the bottom of lakes and rivers during the winter. Prehistorically, bullfrogs may have been used as food on occasion. Today, in areas of abundance bullfrog hind limbs, the famous "frog-legs", are prepared for consumption in many restaurants (Collins 1974:72; Hudson 1942:29).

REPTILIA - REPTILES

Chelydra serpentina (Northern Snapping Turtle) - 25HN36: 6 specimens cf. Chelydra serpentina (?Northern Snapping Turtle) - 25HN36: 4 specimens

The northern snapping turtle occurs throughout Nebraska. It is found in a variety of aquatic habitats (e.g., streams, rivers, ponds, lakes), preferring those with soft muddy bottoms. Northern snapping turtles "often lie buried in the mud in shallow water, with only the head visible" (Hudson 1942:92). These turtles seldom bask in the sun. Eggs are laid on land in shallow holes dug in sand or moist soil. During the winter northern snapping turtles hibernate in the mud on the bottoms of bodies of water. Since the flesh of these turtles is very palatable (Collins 1974:88; Hudson 1942:92), they may have been used occasionally as food, prehistorically.

Kinosternon flavescens (Plains Yellow Mud Turtle) - 25HN36: 2 specimens
cf. *Kinosternon flavescens* (?Plains Yellow Mud Turtle) - 25HN36: 1 specimen

The Plains yellow mud turtle, a semi-aquatic turtle, is common in western Kansas and the project area. It prefers muddy and sandy bottoms in quiet water such as sloughs, backwaters, and swamps. This species is active from early spring to late summer, hibernating in burrows above or below water during winter. Although aquatic vegetation is preferred, this turtle also forages on land (Collins 1974:93-94). It cannot be determined whether the presence of the Plains yellow mud turtle at site 25HN36 is the result of natural or cultural causes.

Terrapene ornata (Ornate Box Turtle) - 25HN36: 28 specimens
cf. *Terrapene ornata* (?Ornate Box Turtle) - 25HN61:5 specimens

The ornate box turtle is found throughout Nebraska. It prefers dry open grasslands, seldom entering wooded areas and it is "extremely independent of water" (Hudson 1942:94). Ornate box turtles hibernate in the ground during the winter. Since it is estimated that these turtles have a population density of more than one individual per square acre (Collins 1974:98), ornate box turtles would have been easy to procure, prehistorically, by simply picking them up when observed. The remains of at least four individuals were recovered from site 25HN36 (Table 92), suggesting that ornate box turtles may have been procured as a food resource and/or as a source of raw material for tools and ornaments (e.g., carapace bowls, shell rattles, etc.).

Chrysemys picta (Western Painted Turtle) - 25HN36: 11 specimens

The western painted turtle occurs throughout Nebraska. This semi-aquatic turtle inhabits shallow rivers, streams, ponds, and lakes with soft bottoms and aquatic vegetation. Although this species enjoys sunning itself, it is very wary and dives at the least hint of danger. It is active from late winter to early fall, hibernating in burrows dug into the muddy bottoms of various bodies of water during winter. Eggs are laid from May to July in holes dug on land in soft soil (Collins 1974:107-108); Wheeler and Wheeler 1966:58-59). The painted turtle may have been easy to procure at such times, but its cultural status at site 25HN36 is not certain.

Trionyx _mutieus_ (Midland Smooth Softshell Turtle) - 25HN36: 2 specimens
Trionyx sp. (Softshell Turtle) - 25HN36: 33 specimens

Two species of softshell turtles are found in southern Nebraska. The midland smooth softshell turtle (_Trionyx muticus_) prefers sandy or muddy bottoms of moderate to fast flowing rivers and streams. The western spiny softshell turtle (_T_. _spiniferous_) inhabits a variety of aquatic situations: oxbows, lakes, ponds and swift-flowing rivers and streams, preferring sandbars, mud flats and bodies of water with soft bottoms (Collins 1974:113, 116). Both species "often lie on the bottom in shallow water, partly covered with sand or mud with only the head visible,...' (Hudson 1942:101). Eggs are laid during June and July on land in holes dug in sand or soft soil. Softshell turtles spend the winter burrowed in the mud on the bottoms of bodies of water. Currently, these turtles are caught with a hook and line and their flesh is very palatable (Hudson 1942:101); therefore, these turtles may have been caught in a similar manner and eaten, prehistorically.

Colubridae (Non-venomous Snakes) - 25HN5: 2 specimens

These specimens are considered to be intrusive. None have been identified to genus.

Elaphe _obsoleta_ (Black Rat Snake) - 25HN36: 12 specimens
cf. _Elaphe_ _obsoleta_ (?Black Rat Snake) - 25HN36: 1 specimen

The black rat snake currently inhabits forested areas in regions east of the project domain (Collins 1974:177). It probably occurred within the Harlan County Lake area when the climate was wetter and more wooded areas were present. its presence at site 25HN36 is considered intrusive.

AVES - BIRDS

Branta _canadensis_ (Canada Goose) - 25HN36: 2 specimens; 25HN57: 1 specimen

The project area forms part of the southern limit of the permanent range of the Canada goose. The habitat of this game bird includes rivers, lakes and marshes. This bird often feeds in open grassland. Transient flocks of this species arrive in the project area in early fall and depart in mid-spring (Bull and Farrand 1977:462; Johnston 1965:11). Although some Canada geese may have been available in the project area yearlong, greater numbers would have been available to the prehistoric inhabitants of the area during the migration seasons. Canada geese were also susceptible to human predation during the molting season (e.g., Grinnell 1923:247-248). "The adults molt all their flying feathers simultaneously, becoming flightless for a few weeks" (Udvardy 1977:444).

Chen caerulescens (Snow Goose) - 25HN54: 1 specimen
cf. Chen caerulescens (?Snow Goose) - 25HN36: 1 specimen

The snow goose is a common transient in Nebraska, passing though the area in mid-fall and mid-spring. This game bird is found around prairies and wetlands during migration (Johnston 1965:11). Snow geese were probably procured by the prehistoric inhabitants of the Harlan County Lake area during fall/or spring migrations. (The specimen from site 25HN54 was found on the beach and may represent a modern individual).

cf. Anas acuta (?Pintail) - 25HN36: 7 specimens

The pintail, a popular game bird, is a common transient in Nebraska. The Harlan County Lake area is near the southern limit of this waterfowl's breeding range and near the northern limit of its winter range. Pintails are usually found around marshes and prairie ponds. Eggs are often laid in grass nests in the uplands, as much as a half mile from water (Bull and Farrand 1977:418-419; Johnston 1965:12; Whitney et al. 1978:63). Although these ducks were available throughout the year, they were probably hunted more intensely during the migration seasons when greater numbers would have been available to the prehistoric peoples of the project area.

Anas discors (Blue-winged Teal) - 25HN36: 1 specimen

The blue-winged teal, a waterfowl, is a common transient in Nebraska. The project area is within this duck's breeding range. This game bird is a local summer resident, arriving in early spring and departing in early to mid-fall. Marshes, lakes and shallow ponds are the preferred habitats of the blue-winged teal. Eggs are laid in grass near the edge of water (Bull and Farrand 1977:421; Johnston 1965:12). Prehistorically, blue-winged teals were probably hunted with greater intensity during the fall and/or spring migrations when greater numbers were available within the project area.

Anas clypeata (Northern Shoveler) - 25HN36: 2 specimens
cf. Anas clypeata (?Northern Shoveler) - 25HN36: 1 specimen

The project area is within the southern portion of the northern shoveler's breeding range. This common transient generally arrives in late winter to early spring and departs in mid-autumn. The habitat of this waterfowl usually consists of marshes and prairie potholes. Eggs are laid in a nest concealed in grassy vegetation, oftentimes at a distance from water (Bull and Farrand 1977:416; Johnston 1965:12-13). A similar procurement pattern as postualted for the other ducks is also suggested for this species.

Anas sp. (Duck) - 25HN36: 4 specimens

These specimens could not be assigned to species. Various species of Anas are common migrants in the project area and these species of ducks were probably actively hunted during migration seasons when larger numbers would have been available and more easily killed in greater numbers by prehistoric populations in the area.

Lophodytes cucullatus (Hooded Merganser) - 25HN36: 1 specimen
cf. Lophodytes cucullatus (?Hooded Merganser) - 25HN36: 1 specimen

The hooded merganser, a small duck-like bird, is an uncommon transient in the project area, occasionally occurring as a winter resident from mid-autumn to mid-spring. Its habitat consits of wooded ponds, lakes and rivers (Bull and Farrand 1977:462; Johnston 1965:15). The hooded merganser may have been occasionally hunted when available within the project area.

Buteo lagopus (Rough-legged Hawk) - 25HN36: 1 specimen
cf. Buteo lagopus (?Rough-legged Hawk) - 25HN36: 1 specimen

The project area is part of the winter range of the rough-legged hawk which is a common winter resident on the open plains of the region (Bull and Farrand 1977:501; Johnston 1965:17). Although this raptor may have been eaten occasionally, it was probably valued for its symbolic and ceremonial qualities (e.g., Parmalee 1977:203-204).

Pedioecetes phasianellus (Sharp-tailed Grouse) - 25HN12: 2 specimens; 25HN36: 1 specimen

The sharp-tailed grouse is an upland ground bird that formerly resided in much of the West. It has been extirpated throughout much of its former range. Prairie grasslands and grassy woodland edges are its preferred habitat (Bull and Farrand 1977:494; Johnston 1965:19). Although this game bird does not appear to have been actively hunted within the project area, prehistorically, based on the large numbers that were probably available in the uplands and on the paucity of remains recovered from site 25HN36 (Table 92), sharp-tailed grouse were probably hunted on occasion, possibly during times of food stress.

Fulica americana (American Coot) - 25HN36: 1 specimen

The Harlan County Lake area is included within the breeding range of the American coot, a common transient in Nebraska and Kansas. Migrations occur in early spring and early fall. The American coot is an irregular winter resident wherever open water is available. The habitat of this aquatic bird consists of open ponds and marshes (Bull and Farrand 1977:419; Johnston 1965:20-21; Whitney et al. 1978:105). Eggs are laid in nests that "are usually built in marshes, of cattails or similar marsh vegetation" (Whitney et al. 1978:105). This game bird may have been procured by the project area's prehistoric populations whenever the opportunity presented itself.

Zenaidura macroura (Mourning Dove) - 25HN12: 1 specimen

The breeding range of the mourning dove includes all of the 48 contiguous states. It is a common summer resident but an uncommon winter resident within the project area. Migrations occur in early fall and early spring. The preferred habitat of this species consists of grasslands and brushy and wooded areas. The latter are used for nesting, while the grasslands are used for feeding (U.S.D.A. Soil Conservation Service 1981). The mourning dove is hunted as a game bird in some states, such as Kansas, and it may have been considered a game bird prehistorically. Although it may have been available yearlong, it was most abundant within the project area during the fall and spring migrations.

Passeriformes (Perching Birds) - 25HN36: 1 specimen

This specimen could not be identified below the level of order. As pointed out by Parmalee (1977:219), large numbers of these small birds were obtained by several historic Plains tribes. These birds may also have been actively hunted by the prehistoric inhabitants of the project area.

MAMMALIA - MAMMALS

Sylvilagus sp. (Cottontail) - 25HN12: 31 specimens; 25HN36: 115 specimens; 25HN40: 1 specimen
cf. Sylvilagus sp. (?Cottontail) - 25HN40: 1 specimen

Specimens of this popular small game mammal could not be assigned to species on the basis of morphological features. Presently, two species of cottontail occur within or near the project area. The eastern cottontail (Sylvilagus floridanus) occurs throughout the Plains, inhabiting open forests, forest edges, brushy areas and grassy areas. Within the project area, this species is probably confined to the riparian habitats along rivers and streams. The desert cottontail (S. audubonii) is found in arid areas such as the High Plains of Nebraska and Kansas, where it occurs on the short-grass prairies of the dry, open uplands. They can also be found in rocky areas and cedar "breaks". Both species have several litters per year but few individuals live longer than a year. These cottontails average between five and seven individuals per acre within their ranges (Bee et al. 1981:69-73; Cockrum 1952:101-107; Jones et al. 1985:122-123). Data suggest that cottontails are and were abundant within the project area. This assessment is supported by the quantity of cottontail remains recovered from site 25HN36, where at least eight individuals are represented (Table 92). Cottontails were probably hunted by prehistoric peoples for food and possibly for other uses as was done by historic groups (e.g., Fletcher and La Flesche 1911:451; Weltfish 1977:326).

Lepus sp. (Jack Rabbit) - 25HN36: 17 specimens
cf. Lepus sp. (?Jack Rabbit) - 25HN36: 2 specimens

Two species of jack rabbits (hares) are currently found within the project area. The white-tailed jack rabbit (Lepus townsendii) occurs in open grasslands and occasionally in brushlands but it avoids woodlands and forests. This species has become extirpated throughout much of its range due to cultivation of its natural habitat. The black-tailed jack rabbit (L. californicus) inhabits open prairies consisting of short-grasses with scattered shrubs. Areas of heavy brush or woods are avoided. Both hares are basically crepuscular to nocturnal. Each species has several litters annually (Bee et al. 1981:76-79; Cockrum 1952:96-100; Jones et al. 1985:128-129). Like cottontails, jack rabbits were probably exploited for food and for other purposes by prehistoric peoples.

Spermophilus _tridecemlineatus_ (13-lined Ground Squirrel) - 25HN36: 1 specimen

The thirteen-lined ground squirrel occurs throughout Nebraska, inhabiting grassland areas (James et al. 1985:160). It is a burrower and its presence at site 25HN36 is probably intrusive.

Cynomys _ludovicianus_ (Black-tailed Prairie Dog) - 25HN36: 4 specimens

The black-tailed prairie dog is a resident of semiarid short-grass prairies and is found across the Great Plains from southern Saskatchwan to northern Mexico. It currently lives in colonies or "towns" within the project area. "It thrives on overgrazed range land and once must have prospered in the wake of disturbance by migratory bison" (Jones et al. 1985:162). This mammal has been extirpated in part of its range as a result of human predation and cultivation of the prairies. "Prairie dogs cannot live in soft ground or tall grass" (Cockrum 1952:120). Prairie dogs were utilized at times as a food resource by historic Plains tribes (Smith 1967:5; Wedel 1970:17) and the same may have been true prehistorically within the project area.

Geomys _bursarius_ (Plains Pocket Gopher) - 25HN36: 19 specimens; 25HN40: 1 specimen; 25HN50: 2 specimens; 25HN125: 7 specimens

The plains pocket gopher ranges throughout the Great Plains. It is the only pocket gopher that occurs within the project area. This rodent inhabits pastures and bottomlands, preferring deep sandy and loamy soils in treeless, open areas. "The plains pocket gopher is more highly specialized for digging than any other North American rodent and lives underground for practically its entire life" (Bee et al. 1981:106). Its main tunnel extends to a depth of a meter or more below the surface (Jones et al. 1985:174). Evidence is lacking concerning the utilization of pocket gophers by historic and prehistoric populations. Due to the extreme fossorial nature of this mammal, the presence of plains pocket gophers within the vertebrate assemblages is considered intrusive and they will not be considered in subsequent faunal discussions.

Castoroides _ohioensis_ (Giant Beaver) - 25HN16: 1 specimen

This specimen was recovered from the beach below site 25HN16. The giant beaver was the largest North American Pleistocene rodent, about the size of a black bear. It had a spatial range that included the project area and its temporal range extended from the Blancan to Late Wisconsinan. Lakes and ponds bordered by swamps were the preferred habitats of this animal. The giant beaver did not build dams or fell trees; therefore, it was probably more similar in habits to the muskrat (Ondatra) than to the modern beaver (Castor) (Kurten and Anderson 1980:236). There is no direct evidence that the giant beaver was ever exploited by humans; however, the occurrence of Clovis points and Pleistocene mammals within Harlan County Lake area are suggestive.

Castor canadensis (Beaver) - 25HN36: 16 specimens

The beaver, an aquatic mammal and the largest extant rodent in North America, occurs throughout the Great Plans and most of North America, although it has become extirpated or reduced throughout much of its range. It inhabits permanent bodies of water. Beavers are abundant along watercourses on the Plains where their preferred foods, cottonwoods and willows, are plentiful (Hall and Kelson 1959:547; Jones et al. 1985:194). Historically, beavers were exploited as a food resource (e.g., Fletcher and La Flesche 1911:103) and for their pelts. The prehistoric inhabitants of the project area may have hunted beaver for similar purposes.

Peromyscus sp. (White-footed Mice) - 25HN31: 1 specimen

Two species of Peromyscus occur within the Harlan County Lake area. Since the white-footed mouse (P. leucopus) inhabits woodlands and dense brushy areas, it is probably restricted to riparian woodlands along the Republican River and its tributaries in the project area. The deer mouse (P. maniculatus) is widespread throughout North America, especially the Plains where it occurs from arid grasslands to floodplains but avoids wetlands. Both species are basically nocturnal (Bee et al. 1981:128-131; Jones et al. 1985:203, 208). There is no evidence that either species was ever culturally exploited; therefore, the presence of Peromyscus within the faunal assemblage is considered intrusive.

Microtus ochrogaster (Prairie Vole) - 25HN33: 2 specimens; 25HN36: 7 specimens; 25HN62: 3 specimens

The prairie vole occurs throughout the central grasslands of North America, inhabiting dry to mesic prairie communities (Bee et al. 1981:145; Jones et al. 1985:233). There is no evidence that prairie voles are present in the faunal assemblages as the result of intentional cultural factors; therefore, these voles are considered intrusive.

<u>Ondatra</u> <u>zibethicus</u> (Muskrat) - 25HN42: 1 specimen
cf. <u>Ondatra</u> <u>zibethicus</u> (?Muskrat) - 25HN36: 1 specimen

The muskrat occurs throughout the Plains. It is semi-aquatic, inhabiting permanent bodies of water such as marshes, ponds, lakes and the banks of slow-moving rivers and creeks (Bee et al. 1981:148-149; Jones et al. 1985:237). Historically, the muskrat has been exploited for its dense, waterproof fur. "The muskrat is the most valuable semiaquatic furbearer in North America in total dollar volume" (Jones et al. 1985:237). Ethnographic data also indicate that the meat of this animal was eaten by some Plains tribes (e.g., Fletcher and La Flesche 1911:104). Muskrats may have been hunted for both their meat and pelts by prehistoric populations within the project area.

<u>Canis</u> <u>latrans</u> (Coyote) - 25HN36: 2 specimens
<u>Canis</u> cf. <u>latrans</u> (?Coyote) - 25HN36:15 specimens

Coyotes occur within the project area. "Although originally an animal of open grasslands, it is now found in a wide range of habitats" (Bee et al. 1981:164). Currently, the coyote is a valuable furbearer (Cockrum 1952:225-226; Jones et al. 1985:257) that may also have been exploited for its fur by prehistoric populations. Historically, coyotes were eaten by some Plains groups (e.g., Grinnell 1923:256) and they may have been used as a food resource, prehistorically, within the project area.

<u>Canis</u> <u>familiaris</u> (Domestic Dog) or <u>C</u>. <u>lupus</u> (Gray Wolf) - 25HN37: 1 specimen

This specimen was recovered from the beach at White Cat Village (25HN37) and could not be assigned to species. Dogs were formerly used by historic Plains tribes for hunting, as beasts of burden and as food. The gray wolf formerly ranged throughout North America but it is now extinct in Nebraska and other states. Gray wolves are predators of large mammals. On the Plains, bison were their usual prey. Historically, thousands of gray wolves were killed every winter for their fur (Cockrum 1952:228; Bee et al. 1981:166-168; Jones et al. 1985:258). Wolves were occasionally eaten by some Plains tribes (e.g., Grinnell 1923:256). Prehistorically, the inhabitants of the project area may have hunted gray wolves for food and for their fur.

Vulpes velox (Swift Fox) - 25HN36: 4 specimens

The swift fox is a Great Plains mammal. Its preferred habitat consists of short-grass prairies but it also occurs in mixed-grass prairies and sandhill prairies. Although this fox was nearly extirpated in the early 1900's, it is becoming numerous again throughout much of its former range (Bee et al. 1981:172-173; Jones et al. 1985:262). Foxes were trapped for their fur by historic Plains peoples (e.g., Grinnell 1923:298) and they may have been hunted for the same reason, prehistorically.

Procyon lotor (Raccoon) - 25HN36: 2 specimens

The raccoon is distributed throughout Nebraska, preferring wooded habitats near water (Hall and Kelson 1959:884); Jones et al. 1985:267). Although the raccoon was utilized by historic Plains peoples (e.g., Fletcher and La Flesche 1911:104); Weltfish 1977:376, 155), there is no conclusive evidence that it was exploited by the prehistoric inhabitants of site 25HN36.

Equus caballus (Domestic Horse) - 25HN37: 1 specimen

This specimen was recovered from the beach at White Cat Village (25HN37), a Dismal River Plains Apache site. Since horse bones have not been previously reported from the extensive excavations at this site or from other Dismal River sites (Gunnerson 1960:177; Wedel 1986:147), this specimen is considered intrusive.

Equus sp. (Horse) - 25HN31: 1 specimen

This specimen was recovered from the beach below site 25HN31 and could not be assigned to species. Although it may belong to a modern horse (E. caballus), the possibility exists that it may belong to an extinct Pleistocene horse. The bones of Pleistocene mammals are common within the Harlan County Lake area. Since there is no unquestionable cultural connection between the occupants of site 25HN31 and this specimen, it is considered intrusive.

Camelidae (Camels and Llamas) - 25HN16: 2 specimens

These specimens were recovered from the beach below site 25HN16 and could not be assignd definitely to genus, although they are probably Camelops, a large llama-like camelid. "Both camels and llamas were common in North American Pleistocene time but became extinct at the end of the epoch" (Kurten and Anderson 1980:301). Although there is no direct association between these bones and prehistoric peoples within the project area, Camelops remains have been recovered from a number of Paleo-Indian sites (e.g., Agogino and Galloway 1965; Irwin-Williams et al. 1973; Frison et al. 1978); therefore, the occurrence of Clovis and Folsom points and Pleistocene mammals, such as Camelidae, within the Harlan County Lake area are suggestive of the possible presence of Paleo-Indian kill and butchering sites.

Cervus canadensis (Wapiti) - 25HN37: 3 specimens

Historically, wapiti (also known as American elk) ranged across the Plains but in the late 1800's they became extirpated throughout most of their range. Since that time they have been re-established in several areas on the Plains. Wapiti are primarily grazers, inhabiting grasslands and woodland edges and feeding upon grasses and forbs. Wapiti are gregarious, living in small herds during the summer and forming larger herds in winter (Bee et al. 1981:218-219; Jones et al. 1985:311). Prehistorically and historically, wapiti were an important food resource for Plains peoples.

Odocoileus sp. (Deer) - 25HN31: 1 specimen; 25HN36: 38 specimens; 25HN37: 1 specimen; 25HN39: 2 specimens; 25HN125: 1 specimen
cf. Odocoileus sp. (?Deer) - 25HN54: 1 specimen; 25HN62: 1 specimen

These specimens could not be assigned to species. Two species of deer occur within the project area. Mule deer (O. hemionus) "inhabit broken country, open plains, brush or woods" (Hall and Kelson 1959:1004) but they prefer rolling hills, rivers and canyons rather than open prairies. Although mainly browsers, they also graze on grasses and forbs (Bee et al. 1981:220-221; Jones et al. 1985:312). White-tailed deer (O. virginianus) occur most frequently in forest edges and riparian habitats. They are more browsers than grazers (Bee et al. 1981:223-224; Jones et al. 1985:313). Deer were an important food resource for prehistoric and historic Plains peoples.

Antilocapra americana (Pronghorn) - 25HN36: 20 specimens; 25HN40: 5 specimens
cf. Antilocapra americana (?Pronghorn) - 25HN40: 2 specimens

Although pronghorn no longer occur within the project area, the Harlan County Lake area was formerly only a small part of a vast pronghorn range that included almost the entire western United States. Although they have been greatly reduced in numbers throughout their range, pronghorn were formerly almost as numerous as bison. They inhabit arid and semi-arid grasslands, subsisting on browse such as sagebrush, buckbrush and rabbitbrush. Prickly pear cacti, forbs and grasses are also consumed (Bee et al. 1981:225-227; Jones et al. 1985:318; Hall and Kelson 1959:1022). Pronghorn were used as a food resource by prehistoric and historic peoples on the Plains.

Bison bison (Bison) - 25HN36: 4 specimens; 25HN37: 23 specimens; 25HN57: 1 specimen

With the exception of deserts and coastal areas, the bison range formerly included the entire United States. Prior to its near extinction, it was the dominant large mammal on the Great Plans, numbering in the millions. Bison were gregarious, living in huge herds. Today, small, public and private herds are maintained in Nebraska and other Plains states. Bison are grazers of prairie grasses and plants, being especially adapted to short-grasses (Bee et al. 1981:229-230; Jones et al. 1985:319; Hall and Kelson 1959:1024). Bison had an important role in Plains Indian life, being the major meat resource and serving as a raw material source for the material culture of Plains peoples.

Bison sp. (Bison) - 25HN16: 1 specimen; 25HN54: 3 specimens

These specimens were recovered from the beach below sites 25HN16 and 25HN54. They were not assigned to species because it could not be assumed that they were necessarily bones of modern bison (*B. bison*). The remains of Pleistocene mammals are common along the beaches of the lake and the condition of these bones suggests that they may belong to an extinct species of bison.

Bison bison (Bison) or *Bos taurus* (Domestic Cow) - 25HN40:1 specimen

This specimen was recovered from the beach below site 25HN40. Both bison and cattle have inhabited the project area. Due to the close skeletal similarity between *Bison* and *Bos*, the specimen could not be assigned to either taxon.

Proboscidea (Mastodonts, Elephants) - 25HN54: 1 specimen

A proboscidean bone fragment was recovered from the beach below site 25HN54. This specimen could not be assigned to genus. Both the American mastodont (*Mammut americanum*) and the mammoth (*Mammuthus* sp.) probably once existed within the project area. The recovery of radiocarbon dated spruce macrofossils from the North Cove site (25HN164) indicates that spruce was part of the vegetational component in the area, the preferred habitat of the American mastodont (Kurten and Anderson 1980:344), was present in the project area at approximately 12,000 - 11,000 B.C. The occurrence of Clovis projectile points and mastodont and/or mammoth remains in the Harlan County Lake area are suggestive of the possible presence of Paleo-Indian mastodont and/or mammoth kill sites.

The Freshwater Mussel (Class: Pelecypoda) Assemblage

Freshwater mussel shell fragments, weighing 769.9 grams, were recovered from 12 sites (Table 91). At least six genera are represented. The majority of the mussel shell assemblage, 78 percent of the total shell weight or 94.5 percent of the total number of shell fragments, are from site 25HN36. This site also contains five of the identified genera (Table 10.4). Following a brief discussion of each of the identified taxa, the significance of the freshwater mussel shell assemblage from site 25HN36, in terms of prehistoric diet, will be considered along with the vertebrate assemblage from this site.

Quadrula quadrula (Maple-Leaf Mussel) - 25HN12: 14.3 g; 25HN31: 44.5 g; 25HN36: 53.4 g

The maple-leaf mussel is common in eastern Nebraska. Presently, its known distribution does not include the project area. However, it does occur in the lower reaches of the Republican River in Kansas and an assessment of the distribution of this species in Kansas also apply to the Harlan County Lake area. "Although there are no records of this species in the extreme western portion of the state [Kansas], it may occur there as isolated populations" (Murray and Leonard 1962:52). With the exceptions of shifting sand and pure mud bottoms, the maple-leaf mussel occurs in any bottom type (e.g., rocky, gravelly, sandy) of shallow to deep permanent bodies of water (Murray and Leonard 1962:53; Parmalee 1967:43).

cf. *Quadrula pustulosa* (?Pimple-Backed Mussel)-25HN12: 5.0 g

The distribution of the pimple-backed mussel is not presently known to include the project area, but it is common within the lower Kansas River. This mussel inhabits all types of bottom, with the exception of shifting sand, in shallow to deep streams and rivers (Murray and Leonard 1962:55-56; Parmalee 1967:40).

cf. Quadrula sp. - 25HN37: 2.2 g; 25HN125: 1.6 g

The small larvae (glochidia) of Quadrula attach themselves to the gills of several species of catfish, including the channel catfish (Ictalurus punctatus). When the juvenal mussel stage is reached, they leave the host fish and fall to the stream bottom (Murray and Leonard 1962:26, 53, 56; Parmalee 1967:8-9). Prehistorically, the Quadrula may have been brought into the project area by catfish.

Tritogonia verrucosa (Buckhorn Mussel) - 25HN12: 2.9 g; 25HN36: 1.0 g

Although the present recorded distribution of the buckhorn mussel does not include the project area, it does occur in the lower reaches of the Republican River. No host is recorded for the glochidia of this species. The buckhorn mussel inhabits rocky, silty, hard mud and soft mud bottoms of large and small streams but avoids shifting sand bottoms (Murray and Leonard 1962:67-68; Parmalee 1967:44).

Uniomerus tetralasmus (Pond-Horn Mussel) - 25HN36: 2.3 g

Although the pond-horn mussel is not known to presently inhabit the project area, it does occur downstream in the Republican River. A host is not recorded for the glochidia of this species. The pond-horn mussel lives in the mud bottoms of shallow ponds, lakes, sloughs and small, quiet streams (Murray and Leonard 1962:83-84; Parmalee 1967:44).

Anodonta grandis (Floater Mussel) - 25HN36: 18.7 g

Presently, the known distribution of this mussel does not include the Harlan County Lake area. "Its occurrence in the Big Blue and Republican Rivers is doubtful because these rivers have shifting sand bottoms and lack quiet pools" (Murray and Leonard 1962:92). They inhabit sandy, mud bottoms in quiet, deep water. Areas of rock and shifting sand are avoided (Murray and Leonard 1962:93; Parmalee 1967:47). Due to its extremely thin shell and the presence of many immature individuals at site 25HN36, this species is mainly represented by the beak or umbone area of the valves.

cf. Ligumia recta latissima (?Black Sand Mussel) - 25HN40:7.8 g

The black sand mussel is not currently found within the project area. Its preferred habitat consists of areas of strong current on coarse sand or gravel bottoms of medium-sized to large rivers (Murray and Leonard 1962:137, 139; Parmal^e 1967:75).

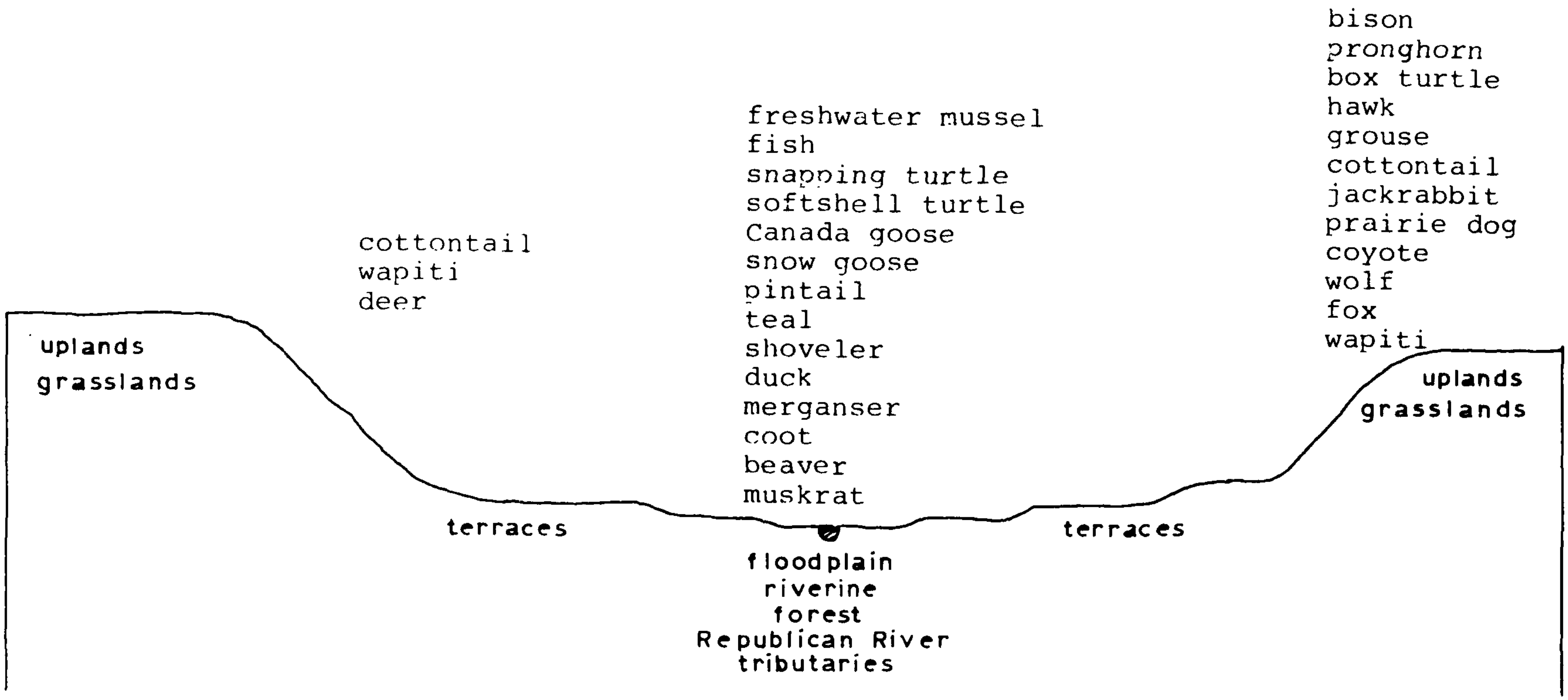


Figure 136. Ecological zones for fauna recovered from site 25HN36.

Lampsilis sp. - 25HN36: 15.2 g

No member of this genus is currently known to exist within the project area. *Lampsilis* species inhabit a variety of river, stream, pond and lake bottoms.

Prehistoric Diet as Reflected in the Faunal Assemblage

The majority of the vertebrate remains and freshwater mussel shells were recovered from the midden area of site 25HN36 (Tables 88 and 91), an Upper Republican habitation site. Therefore, the following discussion will focus mainly on the faunal assemblage from this site (Tables 91 and 92). Only three basic microenvironments are represented by the fauna (Table 93, Fig. 136). Totally woodland/forest adapted fauna are conspicuously absent, suggesting that either such animals were not important to the inhabitants of site 25HN36 or, more probable, available wooded areas consisted of only narrow bands or zones of deciduous trees along the banks of the river and creeks. The majority of the fauna are either aquatic or prairie species.

A total of 602.8 grams of freshwater mussel shells, representing at least five genera, were recovered from site 25HN36 (Table 91). Although mussel shells were used by prehistoric peoples for the manufacture of items such as beads and pendants, the quantity and condition of the recovered shell suggests mussels were also harvested as a food resource. Direct data are lacking, but the mussels were probably gathered by hand or with the aid of a stick when water was low/or clear. They may have been prepared for consumption by being baked, boiled or steamed.

The status of mussels as a major food resource is doubtful. "From the standpoint of nutrition, shellfish appear to rank fairly high in protein content per unit weight, but one would have to eat enormous quantities to maintain adequate protein/calorie levels" (Wedel 1986:127). Therefore, mussels probably functioned as a food supplement (Parmalee and Klippel 1974:432) or perhaps as a "starvation" food (Lyman 1984:98) when other food resources were in short supply.

Fish are represented by sturgeon, gar and catfish remains (Table 92). These were probably exploited as secondary food resources by the inhabitants of site 25HN36. A variety of methods have been employed by various peoples for procuring fish. These techniques include use of the spear, leister, harpoon, bow and arrow, weir, trap, hook and line, and a variety of nets (Parmalee et al. 1972:22).

During spawning, large fish congregate in shallow water near the shore. At these times it was probably feasible to spear the fish (Parmalee et al. 1972:23). The sturgeon, a bottom dweller, may have been caught in this way prehistorically, but it may also have been obtained by other methods. The Cheyenne caught sturgeon in willow nets. They also trapped fish in pounds or pens made of willow saplings (Grinnell 1923:309-310). It was also possible to get fish when water levels lowered in rivers and streams. During these periods fish became concentrated in smaller, shallower areas and were probably caught by hand. Large, bottom feeders were stranded in deep holes and became easy prey. The Pawnee took fish in this way. They preferred catfish, often fishing with a decorticated willow stick mat (Weltfish 1965:231). The Omaha sometimes shot or speared fish. They also used a movable weir of willows to drive fish into shallow water where the fish could then be shot, speared or caught by hand (Fletcher and La Flesche 1911:312). The presence of several young catfish in the assemblage from site 25HN36 suggests that they may have been speared or caught by hand or in nets while they congregated in shallow water during the summer. It is probable that a variety of fishing techniques were employed by the inhabitants of the project area.

Fish were prepared for consumption in a variety of ways by Plains peoples. After wrapping fish in corn husks, the Pawnee boiled or roasted them (Weltfish 1965:231). The Cheyenne dried fish in the sun. Large fish were first cut into strips and their bones were pounded and boiled for grease (Grinnell 1923:310). Although direct evidence is lacking, fish may also have been boiled, roasted or dried by the prehistoric occupants of site 25HN36.

No worked turtle shells were recovered from the midden area of site 25HN36; however, the amount and condition of the turtle remains suggest that turtles were eaten. Although ornate box turtles may have been easy to obtain by simply picking them up when observed, special techniques were probably necessary to acquire the aquatic species. Softshell turtles are difficult to catch because they can swim fast and walk fast and their shells are slippery, making them hard to hold. The Cheyenne used a variety of methods for obtaining aquatic turtles by hand (Grinnell 1923:307). Some were caught as they came to the surface to breathe. The underwater locations of turtles were discerned by long lines of people wading in the water and feeling for the submerged turtles with their feet. The turtles were grasped by hand as they tried to escape or as they were held in place by a foot. "Sometimes a circle was formed of men, women, and children, surrounding a place in the water where turtles were known to be abundant. The people closed in slowly, and sometimes the turtles all moved to the center of the circle, or some of them tried to pass through the ring of people to go to the bank" (Grinnell 1923:307). The turtles were then caught by hand. Similar strategies may have been employed by the inhabitants of site 25HN36.

Among the Pawnee, turtles were used to make soup (Weltfish 1965:231). After first killing the turtles, the Cheyenne eviscerated them while they were still in their shells. "Then a large fire was built, and the turtles were placed about it, standing up on the edges of their shells, and thus roasted. Some people boiled the turtles in their shells" (Grinnell 1923:308). Prehistorically, turtles may have been cooked in similar manners.

Although Euro-American settlement of North America has altered the abundance and distribution of avian species on the Great Plains as the result of large-scale cultivation of the prairies, the draining of upland ponds and sloughs and other land modifications, the archaeological record indicates that waterfowl had been at least migratory visitors within the Harlan County Lake area in the prehistoric past. Data suggest that the earthbound game birds that were probably abundant, permanent residents of the project area were rarely exploited. Game birds are represented in the midden of site 25HN36 almost completely by waterfowl remains. With the exception of the rough-legged hawk (two specimens) and the sharp-tailed grouse (1 specimen), both grassland species, all of the birds from this site's midden are aquatic species (Table 93). Most of these species probably had some populations in the project area; however, the waterfowl populations would have been greatly increased during the spring and fall migrations. The lack of juvenile waterfowl remains suggests that most of the waterfowl were adults obtained during migration seasons. However, adult, resident waterfowl could have been obtained in early to mid-summer during the molting period when they were flightless for a few weeks due to the loss of their flight feathers. The Cheyenne obtained waterfowl in this way. In addition, they killed young birds that were not yet able to fly and collected bird eggs (Grinnell: 1923:52, 247-248). Similar techniques may have been used by the prehistoric inhabitants of the project area.

Historic Plains tribes such as the Omaha boiled and roasted birds. The Omaha roasted a bird by thrusting it on a stick and standing it up before the fire (Fletcher and La Flesche 1911:342). The inhabitants of site 25HN36 may also have roasted and boiled birds. Cut marks were discerned on only one avian specimen, the proximal end of a duck (Anas sp.) coracoid, indicating disarticulation of the wing at the shoulder joint. This suggests that most smaller birds, such as ducks, were probably prepared for cooking with only minimal, if any, disarticulation. Such a pattern was discerned within the avian assemblage from a Woodland village site in Illinois (Parmalee et al. 1972:32).

The mammalian fauna recovered from the midden area of site 25HN36 is dominated by the Lagomorphs (hares and rabbits) and the artiodactyls (deer, pronghorn, wapiti and bison). Although Sylvilagus sp. (cottontail) has the highest frequency of identified specimens and the largest MNI (Table 92), most of the assemblage is very fragmented and unidentifiable but the general size of the fragments is suggestive of animals in the size-range of deer and pronghorn. Fragments within the size-range of wapiti and bison are rare, suggesting that the bones of these mammals were subject to the "schlepp effect" (Daly 1969:149) which states that "the larger the animal killed and the further from the point of consumption it is killed, the fewer of its bones will get 'schlepped' back to camp, village, or other area". The identifiable bones (identifiable as to element) of deer, pronghorn and deer-size mammals within the assemblage are generally carpals, tarsals, phalanges, ribs and vertebrae, all elements with low marrow content. A large portion of the unidentifiable specimens are fragments of long bones of deer-size mammals. Long bones are high in marrow content and the extremely fragmented condition of these bones suggests that the inhabitants of site 25HN36 were processing the long bones of deer and pronghorn for marrow extraction and bone grease.

The large mammalian fauna (the artiodactyls) were probably the primary food resources. Only four identified elements exhibit butchering marks. Cut marks are present on a deer humerus and metatarsal, on a pronghorn lateral malleolus and on a deer-size rib. Lagomorphs (hares and rabbits) were secondary sources of meat. Other fauna recovered from site 25HN36 that may have been occasionally eaten, based on ethnographic data of several Plains tribes (e.g., Fletcher and La Flesche 1911:103-104; Grinnell 1923:256; Unrau 1971:39; Wedel 1970:17), include black-tailed prairie dogs, beavers, muskrats, coyotes, dogs and wolves.

Seasonality

Seasonality, in terms of when certain fauna were more likely to have been procured, can tentatively determined for the fish, turtles and waterfowl from site 25HN36 on the basis of the habits of these animals. Sturgeon and gar were probably caught during the spawning season in mid to late spring. The project area is outside the normal distribution ranges of these fish. However, both migrate upstream prior to spawning and it was at this time that they were probably caught. The young catfish present in the assemblage may have been caught in the summer as they congregated in shallow water. They retreat to deep water in the winter and also as they grow in size. The represented turtles hibernate from October to March or April, suggesting that they were most easily obtained during the spring and summer. Although most of the represented waterfowl probably had permanent populations within the project area, the waterfowl could have been more easily taken in greater numbers during the spring and fall migrations. In the summer, adult, resident waterfowl could have been obtained during the molting period when they were temporarily flightless. In summary, although some exceptions are always possible and probable, a mid-spring to early fall procurement of fish, turtles and waterfowl is postulated.

Summary

Each of the major faunal classes is represented in the faunal assemblage from the midden area of site 25HN36. The majority of the identified fauna are either aquatic or prairie species (Table 93). Aquatic fauna that were definitely exploited for food were the freshwater mussels, fish, aquatic turtles and waterfowl. It is postulated that most of the aquatic fauna was procured from mid-spring to early fall. Prairie and forest-prairie edge animals that were regularly exploited for food include the artiodactyls (deer, pronghorn, wapiti and bison), the Lagomorphs (hares and rabbits) and the ornate box turtle. The freshwater mussels, fish, turtles (aquatic and grassland forms), waterfowl, cottontails and jack rabbits probably functioned as secondary food resources. They may have been procured to add variety to a diet that was otherwise heavily dependent on deer, pronghorn, wapiti and bison and/or to stave off starvation during times when stored food was running low or spoiling.

Table 93

Preferred Habitats of Potentially Significant Fauna From Site 25HN36

	aquatic	prairie	forest-prairie edge
Freshwater mussels	X	-	-
Fish	X	-	-
REPTILES:			
Northern snapping turtle	X	-	-
Plains yellow mud turtle	X	-	-
Ornate box turtle	-	X	-
Western painted turtle	X	-	-
Softshell turtle	X	-	-
BIRDS:			
Canada goose	X	-	-
Snow goose	X	-	-
Pintail	X	-	-
Blue-winged teal	X	-	-
Northern shoveler	X	-	-
Duck sp. (Anas sp.)	X	-	-
Hooded merganser	X	-	-
Rough-legged hawk	-	X	-
Sharp-tailed grouse	-	X	-
American coot	X	-	-
MAMMALS:			
Cottontail sp.	-	X	X
Jack rabbit	-	X	-
Black-tailed prairie dog	-	X	-
Beaver	X	-	-
cf. Muskrat	X	-	-
Coyote	-	X	-
Dog or Gray Wolf	-	X (wolf)	-
Swift fox	-	X	-
Wapiti (25HN37)	-	X	X
Deer sp.	-	-	X
Pronghorn	-	X	-
Bison	-	X	-

Macrobotanical Analyses

Mary J. Adair

Introduction

According to ethnographic accounts and observations of present day hunter-gatherers, plant foods often comprise over 50 percent of the diet of non-agricultural populations. Among populations that plant, grow and harvest crops, plants become the staple food in the diet. Unfortunately, archaeological deposits seldom give testimony to this practice for prehistoric populations. Problems of poor preservation, inadequate sampling and destructive recovery techniques often combine to make floral remains the single most underrepresented remains in an archaeological site. In addition, identification of any recovered specimens can be difficult since the remains must be charred to survive in open air prairie deposits. Charring destroys most plant parts (e.g., leaves, stems, roots) and leaves the seeds void of several external characteristics that help in the identification process.

In the past 20 years however, refined recovery, sampling and identification techniques had diminished some of these problems. Water flotation, first introduced in 1968 (Streuver 1968) has become a highly mechanized operation (Watson 1976) while equipment such as scanning electron micrograph (SEM), have clearly identified the remaining characteristics of certain important seed foods (Ford 1985). Still, we have much to learn about the patterns of food discard by the prehistoric inhabitants, since an understanding of these patterns will allow for better sampling procedures.

In a testing project such as this one, the recovery of sizeable amounts of floral remains is often fortuitous. Features, such as house floors, storage pits and hearths, are likely locations for the recovery of charred seeds. Since test excavations are usually limited, the likelihood of identifying a feature is often small. In this project however, tests were successful in identifying features from three sites, 25HN12, 25HN37 and 25HN40. Despite this, floral remains were extremely few and most represented recent intrusions into the archaeological deposits. The few identifiable charred remains however, provide important insight into the diet of the Upper Republican people.

Methods and Techniques

According to the research design (Adair and Brown 1985) flotation samples were taken from each of the sites tested (with the exception of Buffalo Bill's Cave). Table 94 lists

Table 94

Flotation Samples From Sites Investigated in Project Area

site	unit	level depth below surface cm
25HN5	6	10-20
	8	10-20
	9	10-20
		30-40
25HN6	2	10-20
	3	10-20
25HN12	Feature 1	
	4	15-25
25HN32	1	20-30
25HN33	1	10-20
25HN35	4	10-20
25HN37	Feature 1	25-39
	1	10-20
	3	10-20
25HN39	2	10-20
		20-30
	4	10-20
		30-40
25HN40	1	0-10
	Feature 1	10-20
		30-40
	3	10-20
		20-30
	4	0-10
25HN42	1	10-20
	2	10-20
	3	10-20
		20-30
25HN50	1	30-40
		50-60
	2	20-30
	4	0-10
		10-20

Table 94 cont.

25HN51	2	10-20
	3	10-20
	4	0-10
25HN52	4	10-20
25HN61	3	10-20
25HN62	8	10-20
	5	30-40
25HN124	2	10-20
	3	20-30
25HN125	1	40-50
		50-60
	2	20-30
		30-40
		70-80
	3	20-30
	4	30-40
25HN164	silty clay below Bench B, above oxidized band (F1), see Profile 2, Map B, Chapter 7.2.	
	silty clay below band of oxidized sandy silt and at level of retouched flake, see Profile 2, Map B, Chapter 7.2.	
	below Bench B and oxidized band of sandy silt. At level of retouched flake and vegetation (spruce) debris, see Profile 2, Map B, Chapter 7.2.	
	upper 20 cm of lowest bench, J. D. Stewart's trench number 1 clay stratum.	
	upper 20 cm of lowest bench, J. D. Stewart's trench number 1 clay stratum.	

the provenience of each sample. Sample size was approximately eight liters while all of the matrix from the features was removed for flotation (see Chapter 7.1 for size of feature). These samples were floated using a "back-yard" version of the SMAP barrel (Watson 1976). A garden hose was used for the water source which greatly reduced any further contamination by fresh seeds. The light fraction was screened through a #40 geological sieve (mesh size -0.016 inch) while standard window screen mesh was used for the heavy fraction. All samples were allowed to completely dry before being packaged, labeled and transported to the lab. Initial sorting of the light fraction was accomplished with the use of a 10X magnifier lamp. All charcoal and seeds were sorted from sometimes heavy accumulation of grass, leaves, twigs and insect remains. Further sorting of the seeds into fresh or charred categories was conducted using a binocular microscope at power levels varying from 10X to 40X. Wood charoal was also separated from the charred seeds.

Results

As presented in Chapter 7.1, only six sites were initially determined to potentially provide information necessary in subsistence reconstruction. All samples from all sites were examined but most did not warrant further attention since very few seeds or charcoal were noted in the initial sort. Sites that appeared to have a sufficient amount of preserved floral remains included 25HN12, 25HN36, 25HN37, 25HN39, 25HN40 and 25HN125. Unfortunately, while the quantity of seeds recovered from some of these sites was impressive, closer examination revealed that with one exception, they were fresh seeds. Identified fresh seeds included goosefoot (Chenopodium berlandieri), carpetweed (Mullugo verticillata), sunflower (Helianthus annuus), pigweed (Amaranthus sp.) and smartweed (Polygonum pensylvanicum).

These five plants are all common to the Central Plains and thrive in similar habitats. Goosefoot, pigweed, smartweed and carpetweed can be found in gardens, cultivated fields, wastelands and road ditches (Nebraska Department of Agriculture 1979). Sunflowers are extremely common throughout all of Nebraska and grow on almost all soils. They are frequently one of the first plants to inhabit a recently disturbed area. Goosefoot also shares this characteristic of being a pioneer species. The relative abundance of this plant is one factor used in the argument for the prehistoric cultivation of goosefoot (Asch and Asch 1985). By Middle Woodland times, domesticated goosefoot was grown in westcentral Illinois (Asch and Asch 1982, 1985). The species goosefoot (C. berlandieri) is easily recognized by its distinctive alveolate surface on the seed coats.

While its distribution in the Plains is fairly widespread, research has not yet identified cultigen goosefoot in this region.

Another indigenous plant that is abundantly found in the Plains today and was unmistakenly domesticated in prehistory is the common sunflower (Helianthus annuus). Sunflower achenes first appear in archaeological deposits in the Central Plains during the Late Archaic period. Seed size measurements, the single factor that distinguishes a wild plant from a cultivated one, indicate that the seeds from the Late Archaic deposits at the Coffey site (14PO1) are from wild plants. The first strong evidence for sunflower domestication comes at about A.D. 900-1,000 from several sites in eastern Kansas. Sunflower achenes from Two Deer (14BU55) and Hatcher (14DO19) are significantly larger than modern wild achenes and fall well within the range of the cultivated variety of sunflower (Helianthus annuus var. macrocarpa) (Adair 1984). Domestication of this indigenous annual continues during the Plains Village and Proto-historic periods. It is the only indigenous plant to be recognized as a crop by Euro-American traders and settlers when they first encountered the Plains Indian tribes.

Little information is available on the distribution and importance of this crop during the Plains Village period however. Most data are from Mississippian Steed Kisker sites while the subsistence economy of the Upper Republican, Smoky Hill and Nebraska complexes are merely assumed to include cultivated sunflower. Data recently analyzed from Glenwood and Smoky Hill sites (Adair, in press) demonstrate that the domesticated sunflower was indeed an important food item during the time. Flotation samples from 25HN36, an Upper Republican village, were successful in retrieving a single sunflower achene. Its uncorrected size is 8.2 X 4.0 mm. Corrected measurements, which compensate for shrinkage due to carbonization, are an increase of achene length and width by 11 and 27 percent, respectively (Yarnell 1978). This results in a reconstructed size of 9.1 X 5.1 mm, a size significantly larger than the range of wild plant seeds (approximately 3.9 - 5.2 mm in length). Although these data are somewhate limited by the recovery of only one achene, its size is undisputed evidence for the cultivation of this plant by the prehistoric habitants of 25HN36. Additional data recovery from this site may well yield even more supportive evidence.

The majority of macrofloral remains recovered by flotation consists of wood charcoal. In fact, wood charcoal comprised the entire sample from feature 1 at 25HN12 and is represented by smaller but still sizeable amounts from the features at 25HN37 and 25HN40. Wood charcoal is often a common remain in storage pits and hearths but its dominance at 25HN12 requires some explanation and perhaps speculation. According to site descriptions in Chapter 7.1, this feature contains trash and debris that had been redeposited from other locations at the site. In all probability, the pit was not open for very long and may have been filled quite rapidly. If this action took place during the winter or spring, normal seed rain would not have contributed any intrusive seeds. If the charcoal was a by-product of a non-food related activity (e.g., chert heating), and if this activity took place in the winter, plant remains would not likely be included.

Phytolith Analysis for Cultigen Identification:
Sites 25HN36, 25HN37 and 25HN40

Steven Bozarth

Introduction

When plant roots absorb water they also take up silica in solution (Peterson 1983). Microscopic silica bodies are formed by the precipitation of hydrated silica dioxide ($SiO_2.nH_2O$) in, around and between plant cell walls. Silica bodies produced in plants with characteristic shapes are called opal phytoliths (Wilding and Drees 1971). Phytolith is derived from the Greek words phyton, meaning plant, and lithos, meaning stone. Opal is the common name for hydrated silica dioxide (Parry and Smithson 1958).

Phytoliths are resistant to weathering and are preserved in most soils for long periods of time (Twiss 1978; Carbone 1978; Wilding 1967; Piperno 1984). There are many varied shapes and sizes of phytoliths due to the many different types of cells in any particular plant (Rovner 1975). Phytoliths are diagnostic when plant cells specific to a particular taxon are silicified.

Methods and Results

Phytolith identification of maize, beans, squash, pumpkins, gourds and sunflowers in prehistoric villages largely depends on diagnositc phytoliths being produced in their seed-bearing structures since they are the parts of the cultigens that would have been taken to the villages (Bozarth 1986). The author extracted phytoliths from the seed and rinds of five non-hybrid varieties of squash and pumpkins (*Cucurbita pepo* and *C. maxima*), seed and rinds of two non-hybrid varieties of bottle gourds (*Lagenaria siceraria*), and seed and pods of two non-hybrid varieties of beans (*Phaseolus vulgaris*), achenes and disks of two non-hybrid varieties of sunflowers (*Helianthus annuus* var. *macrocarpa*), and the seed, husks, and cobs of ten non-hybrid varieties of maize (*Zea mays*). To determine if these cultigen phytoliths are diagnostic, they were compared to phytoliths extracted from 17 species of Gramineae, four species from other monocot families, 17 species of herbaceous dicots, 12 speices of arboreal dicots, nine species of gymnosperms and one horsetail (*Equisetum*) species. These reference plants were selected because they are among the most common plants indigenous to the Central Plains. Phytoliths were extracted from the reference plants with a procedure modified from Rovner (1971, 1972) using Schultze's solution (three parts 70% nitric acid and one part saturated potassium chlorate) to oxidize the plant material.

Based on analysis of this reference collection, it was determined that spheriodal and hemispheriodal phytoliths with deeply scalloped surfaces of contiguous concavities produced in rinds of certain varieties of squash can be used as indicators of squash in archaeological sites (Bozarth 1985). Distinctive hook-shaped silicified hairs are produced in bean pods and distinctive silicified multi-celled hair bases are produced in sunflower (Helianthus annuus) disks (Bozarth 1986). These phytolith types may be diagnostic as they were not produced in any of the other reference materials that include nine Compositae species of the Helianthus tribe. Bozarth (1984) identified silicified sunflower like multi-celled hair bases in phytoliths isolated from soil samples collected in features at site 25DX30, a Central Plains Tradition Village in Northeast Nebraska.

Numerous distinctively shaped phytoliths that have concave to straight sides and narrow (at least three times as long as wide) tops and bottoms were produced in cobs of all the reference maize varieties studied. This phytolith type appears to be diagnostic since it is not produced in any of the other reference materials and was not reported by Brown (1984) or Twiss et al. (1969) in their classifications of grass phytoliths.

Gramineae species produce a wide variety of morphologically distinctive phytoliths (Rovner 1975). The Panicoid grasses are characterized by dumbbell and cross-shaped phytoliths (Twiss et al. 1969). Analysis of phytoliths from leaves of several varieties of maize (a Panicoid grass) and wild Panicoid grasses indigenous to Ecuador indicates that certain cross-shaped phytoliths produced in maize were significantly larger than those produced in the wild grasses and could be identified on the basis of size (Pearsall 1978). Subsequent research based on an extensive phytolith reference collection of Panamanian flora demonstrates that size alone is not a diagnostic characteristic that can be used to identify cross-shaped maize phytoliths but that cross-shaped phytoliths from maize leaves can be distinguished from those of wild grasses by combining size and three dimensional form (Piperno 1984). Numerous cross-shaped phytoliths typical of Panicoid grasses were extracted from the husks of all the reference maize varieties studied but none appeared to be unique to maize either in size or shape when compared to cross-shaped phytoliths from certain indigenous Panicoid grasses. This indicates that either there are significant differences in size and shape of cross-shaped phytoliths between maize leaves and husks or that there are significant differences in cross-shaped phytoliths produced in the various indigenous grasses and varieties of maize growing in different regions.

Piperno (1984) found a very low ratio of dumbbell to cross-shaped phytoliths in maize leaves when compared to most but not all of the reference grasses idigenous to Panama. To determine if the ratio of dumbbell to cross-shaped phytoliths might be diagnostic of maize in the Central Plains, the author compared the ratio of these two types of phytoliths produced in husks of the reference maize varieties to the native reference grasses and concluded that low ratios of dumbbell to cross-shaped phytoliths are not diagnostic of maize.

Phytoliths were isolated from soil samples collected in unit 3 (0-10 cm) and unit 6 (10-20 cm) at site 25HN36, in unit 1 (feature 1) at site 25HN37 and feature 1 at site 25HN40. Phytoliths were isolated from 10-gram soil samples using a modified procedure developed by Rovner (1971) based on heavy-liquid flotation (using zinc bromide mixed to a specific gravity of 2.3) and centrifugation. More than 30,000 phytoliths from each sample were scanned using 400X magnification. No cultigen phytoliths were found. This does not necessarily mean that cultigens were not present at these sites since cultigen remains may be present in site areas not sampled.

Conclusion

Recovery of faunal and botanical remains from sites investigated during this project have yielded information regarding seasonality of probable site occupation and prehistoric subsistence economies. Although most samples were small, the data have contributed to the knowledge of prehistoric lifeways in the Harlan County Lake area.

Chapter 11

Site Evaluations, Recommendations, and Conclusions

Mary J. Adair
Kenneth L. Brown

Introduction

Based on recommendations provided by previous cultural resource management reports the U.S. Army Corps of Engineers, Kansas City District, funded the present project to test 28 sites for potential eligibility for nomination to the National Register of Historic Places. These sites included prehistoric, historic and paleontological components. A multidisciplinary approach was undertaken that included professional archaeologists, historian, geomorphologist, paleontologist and palynologist. In testing for National Register eligibility certain research goals were delineated. These included environmental reconstruction of paleoclimates and geomorphic events, refinement of culture history and chronology and an investigation of settlement and subsistence patterns.

In this chapter, field methods for all sites are reviewed, the culture history and chronology is refined according to the data recovered, and the sites are evaluated for their potential eligibility for inclusion in the National Register of Historic Places. The information retrieved by the test excavations revealed that four sites are potentially eligible for nomination. Discussions on each of these sites are presented, including arguments for their significance.

Field Investigations

The 28 sites were investigated using several field techniques depending on the cultural deposits and site situations. Table 95 summarizes these investigations. All sites were tested by manual excavation. Manual excavations ranged from 0.1 to 4.9 cubic meters. Most of the cultural deposits were determined to be confined to the plowzone. Therefore, manual excavations were minimal at sites 25HN14, 25HN16, 25HN33, 25HN35, 25HN38, 25HN50, 25HN51, 25HN52, 25HN54, 25HN57, 25HN61, 25HN124 and Buffalo Bill's Cave. In contrast, where cultural remains were determined to extend to a greater depth manual excavations were more substantial. These sites include 25HN5, 25HN6, 25HN12, 25HN31, 25HN36, 25HN37, 25HN39, 25HN42, 25HN53, 25HN60, 25HN62 and 25HN125. Special cases where in situ deposits were recognized but manual excavation was limited include sites 25HN40 and 25HN164.

Table 95

Summary of Field Investigations

site	manual excavations cubic meters	backhoe trenches	coring	examination cut banks
25HN5	4.9	no	no	yes
25HN6	1.5	yes	no	no
25HN12	1.5	yes	no	no
25HN14	0.8	no	no	yes
25HN16	1.2	no	no	yes
25HN31	3.7	yes	no	yes
25HN32	1.7	yes	no	no
25HN33	0.8	no	no	yes
25HN35	0.9	no	no	no
25HN36	2.5	no	no	yes
25HN37	1.8	no	no	yes
25HN38	1.1	yes	no	no
25HN39	2.2	yes	no	no
25HN40	1.4	no	no	yes
25HN42	2.3	no	no	no
25HN50	1.4	no	no	yes
25HN51	1.0	no	no	no
25HN52	1.2	no	no	no
25HN53	1.6	yes	no	yes
25HN54	1.0	no	no	yes
25HN57	0.7	no	no	no
25HN60	1.7	yes	no	no
25HN61	1.1	yes	no	no
25HN62	1.9	no	no	yes
25HN124	1.3	yes	no	no
25HN125	2.5	yes	no	yes
25HN164	1.0	yes	yes	yes
Buffalo Bill's Cave	0.1	no	no	no

Backhoe trenching and examination of exposed cut banks were techniques employed to determine the presence of deeply buried cultural deposits. Often these techniques were used to compliment each other. For example backhoe trenching was often used when cut banks were not present or did not yield evidence of buried cultural deposits. This was the case at sites 25HN6, 25HN12, 25HN32, 25HN38, 25HN39, 25HN60, 25HN61 and 25HN124. Where cut banks were present backhoe trenches were dug perpendicular to the cut bank in order to expose a different cross section of the site. Four sites employed both backhoe trenching and examination of cut banks. These include 25HN31, 25HN53, 25HN125 and 25HN164. Ten sites had exposed cut banks where backhoe trenching was not employed. These include 25HN5, 25HN14, 25HN16, 25HN33, 25HN36, 25HN37, 25HN40, 25HN50, 25HN54 and 25HN62.

Four sites located in the upland loessal deposits were not trenched with a backhoe, nor did they have exposed cut banks. According to the project geomorphologist, the occurrence of deeply buried cultural deposits is unlikely since these sites occur on stable land surfaces. To verify this, two upland sites, 25HN6 and 25HN61, were trenched with negative results. At 25HN57, which is the only site investigated that is located on the beach, trenching was not possible due to a high water table. Manual excavations encountered the water table at a depth of 25 cm. Trenching was not conducted at Buffalo Bill's Cave either because site situation (i.e., bedrock) was not conducive to this technique.

According to the Research Design (Adair and Brown 1985) coring techniques were proposed for only the North Cove site (25HN164). Coring was proposed in order to acquire soil samples to a depth of seven meters. Six cores were extracted to a depth that corresponded to the stratigraphic units observable on the cliff face. This was approximately five to seven meters. A backhoe trench was attempted perpendicular to the cliff face, however an adequate depth could not be reached.

Culture History and Chronology

The first goal of culture history and chronology for this project was the recognition and/or refinement of cultural affiliation of the 28 sites. While cultural affiliation was recorded for several of the sites prior to our investigations, others yielded meager diagnostic artifacts. Based on our investigations and analyses, the following number of cultural components are recognized (Table 96): possible Paleo-Indian (1), Plains Woodland (7), Upper Republican (11), Dismal River (1), White Rock (1) and Historic (1). Cultural affiliation is indeterminate at seven

Table 96

Site Cultural Affiliations

site	Paleo-Indian	Plains Woodland	Upper Republican	White Rock	Dismal River	Historic	?
25HN5			X				
25HN6							X
25HN12		X	X				
25HN14							X
25HN16							X
25HN31			X				
25HN32		X					
25HN33			X				
25HN35		X					
25HN36			X				
25HN37					X		
25HN38		X					
25HN39				X			
25HN40		X					
25HN42			X				
25HN50		X				X	
25HN51			X				
25HN52			X				
25HN53							X
25HN54			X				
25HN57							X
25HN60			X				
25HN61							X
25HN124							X
25HN125		X					
25HN164	X(possible)						
Buffalo Bill's Cave						X	

sites. The number of components are greater than 28 because some of the sites are multicomponent. Buffalo Bill's Cave has been determined to only be a legend (see Chapter 7.1).

There are four sites (25HN5, 25HN36, 25HN37, and 25HN40) that have yielded or are likely to yield significant scientific data that will help reconstruct the lifeways and environments for the Keith Woodland, Upper Republican and Dismal River cultural complexes. These sites offer more complete data pertinent to such issues as season of site occupation, exploitation of locally available flora and fauna, the presence of domesticated plants, and the time of occupation. Radiocarbon dates obtained from some of these sites, plus dates obtained from 25HN12, are listed in Table 97.

Refinement of Culture History at Four Sites

Site 25HN40 has yielded *in situ* cultural features and artifacts attributed to the Plains Woodland Keith complex. While little is known of the Keith complex settlement-subsistence patterns, available data from southcentral Nebraska and northcentral Kansas suggest that most sites were not permanently occupied, but instead inhabited only during part of the year. Although a season of occupation at site 25HN40 cannot be determined from the test data, the occupation appears to have been temporary and perhaps repeated.

Sites 25HN5 and 25HN36 have yielded *in situ* cultural features and artifacts attributed to the Upper Republican complex. Graham Ossuary, 25HN5, is a community burial area while 25HN36 is a small hamlet consisting of at least two earthlodges.

White Cat Village (25HN37) has yielded significant data regarding the Dismal River Plains Apache for the Central Plains. Two additional radiocarbon dates of AD 1640 and AD 1700 confirm this site as a late protohistoric to early historic occupation (Table 97). The presence of an *in situ* baking pit (see Chapter 7.1) indicates cultural features and artifacts are preserved at the site.

At the North Cove site (25HN164) a retouched quartz flake was recovered from Unit C in association with Late Wisconsinan Age fauna and flora. Overlying horizons have been radiocarbon dated to 10,730, 11,150 and 11,015 B.C. (Table 97). As previously discussed, this artifact was found in the geologic screen in which sediments from this horizon were being screened and sorted. Although an intrusive nature of this artifact appears to be very unlikely, stronger association with the Late Pleistocene deposits would be preferred. If the association is valid, the North Cove site may be the oldest known, radiocarbon dated, human occupation in the Central Plains. This makes it a possible pre-Clovis occupation. Further discussion of this site

Table 97

Radiocarbon Dates

site	material	provenience	laboratory number	date B.P.	date B.C./A.D.
25HN12	charcoal	Feature 1	UGa-5478	1250.110	A.D. 700
	charcoal	Feature 1	UGa-5482	1050.70	A.D. 900
	charcoal	Feature 1	DIC-3325	1220.55	A.D. 730
25HN37	charcoal	Feature 1	DIC-3327	310.65	A.D. 1640
	charcoal	Unit 1	DIC-3326	250.100	A.D. 1700
25HN164	spruce wood	Unit D	Beta-18188	12,680.250	10,730 B.C.
	spruce wood	Unit F	*Beta-12286	14,810.100	12,750 B.C.
	spruce wood	Unit F	UGa-5477	13,100.140	11,150 B.C.
	spruce wood	Unit F	UGa-5476	12,965.135	11,015 B.C.
	Bison humerus	Unit O	UGa-5480	11,365.865	9,415 B.C.
	Bison vertebra	Unit N	UGa-5475	11,020.635	9,070 B.C.
	Bison metapodial	Unit K	UGa-5474	10,120.405	8,170 B.C.

* Date obtained by J.D. Stewart prior to this project.

however, and its potential eligibility to the National Register, is deferred until a future date. Data retrieved during additional investigations await analysis.

Site Evaluations and Recommendations

Test excavations, at 28 sites in this study, revealed four sites are potentially eligible for nomination to the National Register of Historic Places. These sites are reviewed, arguments for their significance are detailed, and specific recommendations for each site are provided.

The four sites recommended for potential eligibility for nomination to the National Register of Historic Places are the Graham Ossuary (25HN5), 25HN36, White Cat Village (25HN37), and 25HN40 (Table 98). Various methods for preservation and data recovery at potentially eligible sites include four alternatives: (1) bank stabilization; (2) sodding and fencing to prevent destruction by vandals and campers; (3) placement of National Register markers outlining penalties and fines; and (4) data recovery. Both immediate and long term actions are recommended for two of the sites. At 25HN37 and 25HN40 long term action is recommended whenever monies for funding are available. Although the long term action is the preferred recommendation, immediate action will stabilize site integrity until further action can be taken. Prior to discussion of these alternatives, arguments for the eligibility of the above four sites are presented.

National Register

The National Historic Preservation Act of 1966 (Public Law 89-665) created the National Register of Historic Places as a list of properties "significant in American history, architecture, archaeology, and culture" (Sec. 101 (a)(1)). Criteria for evaluation and determination of eligibility for nomination to the National Register of Historic Places are set forth in 36 CFR 60.4 (Federal Register 1981).

> The quality of significance in American History, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> b) That are associated with the lives of persons significant in our past; or

c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) That have yielded, or may be likely to yield, information important in prehistory or history.

For purposes of this project the fourth criterion (d) is applicable to the sites discussed. All four sites had been previously investigated in some manner prior to the present investigations and all yielded information important in prehistory. Because of existing in situ deposits, all are likely to yield additional information that can help elucidate the prehistory of the region. The other 23 sites (Table 98) have been determined not to contain in situ cultural deposits that would help elucidate the knowledge about the prehistory of the region. Cultural remains at most of these sites are contained within the plow zone.

A determination of National Register eligibility on small hunting-gathering camp sites is a difficult task, particularly in the Central Plains where such sites are in open air situations and where federally funded testing projects specifically limit the amount of subsurface testing that may be conducted. Eligibility status is determined by the significance of the site, which in turn rests in part on site integrity. Disturbed or eroded sites are less likely to maintain the integrity of their cultural materials, although such artifacts may be abundantly present on the surface. Testing projects cannot investigate all subsurface areas overlain by cultural materials. Rather, professional experience suggests testing be conducted in areas where disturbance is less likely, as along a terrace edge rather than in low lying areas. This project maintained a geomorphologist in the field during all site testing, who consulted daily with the archaeologists on such matters as site disturbance, backhoe trench profiles, the nature of various soils exposed, probablility of buried components, and location of test units. This consultation hopefully lessened some of the problems in selecting areas for test units and made site integrity an easier assessment. The 23 sites determined not eligible for National Register nomination did not contain observed, intact cultural materials. Therefore, their integrity is questionable and further work at the sites would appear to be unwarranted.

Table 98

Site Evaluations and Recommendations

site	no action	NR*	immediate action	long term action
25HN5		*	burial, fencing	patroling
25HN6	*			
25HN12	*			
25HN14	*			
25HN16	*			
25HN31	*			
25HN32	*			
25HN33	*			
25HN35	*			
25HN36		*	data recovery	none
25HN37		*	fencing	stabilize bank/ data recovery
25HN38	*			
25HN39	*			
25HN40		*	fencing	data recovery
25HN42	*			
25HN50	*			
25HN52	*			
25HN53	*			
25HN54	*			
25HN57	*			
25HN60	*			
25HN61	*			
25HN62	*			
25HN124	*			
25HN125	*			
25HN164[1]				

*NR : Potential eligibility for nomination to the National Register of Historic Places

[1]Evaluation deferred until additional data are analyzed

Graham Ossuary, 25HN5

Although the site has been subjected to previous investigations by archaeologists (Strong 1935) and vandals, test excavations indicate portions of the ossuary have intact cultural remains that include human burial remains, lithics, ceramics and objects of shell. The precise location of the 1930 (Strong 1935) excavations at the site are not known; however, present tests indicate they were primarily east of the datum (see Chapter 7.1). This would include test units 7 and 8 of the present investigation. Excavation units 1 through 6 and 9 were in areas not extensively disturbed by previous digging. Some of these tests were dug to a depth of greater than 50 cm. Tests indicate the center of the ossuary was dug by Strong (1935) and our excavations focused on the western periphery of the site. Our investigations indicate the site size is approximately 1,500 square meters. Strong's (1935) excavations did not include sifting the soils through hardware cloth. Consequently, our excavations within Strong's recovered large quantities of human skeletal remains. Strong (1935) recovered several copper ornaments. Given the presence of intact cultural remains on the peripheral portions of the ossuary, the authors believe the site contains significant scientific data that would help elucidate the prehistory of the region.

It is difficult to know exactly how much of the Graham Ossuary site area is undisturbed. Vandals have repeatedly disturbed the site over many years, and it is impossible to determine from the site surface what areas and how extensive this pothunting has been. However the 1985 tests indicate a portion of the site remains relatively undisturbed and contains a quantity of human remains and artifacts. Examination of the identifiable human elements discerned the presence of at least 17 individuals, including two fetuses, three infants, three children, two sub-adults and seven adults. Cultural artifacts include approximately 800 items ranging from various lithics to shell pendants and beads. Since the site is an ossuary, it represents the secondary interments of many individuals over a period of time. These individuals may have originally been placed on scaffolds elsewhere following death and subsequently placed in the ossuary. Given this kind of interment, the amount and size of materials recovered in 1985 is to be expected and the limited tests indicate that these deposits were relatively undisturbed. The investigations further substantiate the claim that the site could yield additional data in a similar context.

Few ossuaries have been excavated using dry screening and water flotation techniques. Consequently, small, fragile and potentially significant remains have not been recovered and are not considered characteristic of this type of burial. For example, shell beads are commonly recovered from ossuaries and were probably a type of grave offering or adornment for the body. However, no study has demonstrated size variability for shell beads. Were bodies interred complete (hands and feet included)? Were any grave offerings consisting of plants or foods included? Are both sexes and all ages represented? What was the infant mortality rate? What was the life expectancy? What were the problems associated with old age? What was the frequency of arthiritis? What was the frequency of disease? All of these questions require a fairly large number of individuals in order to be addressed. Such human skeletal populations are not numerous in the Central Plains.

25HN36

Previous investigations at the site in 1950, 1951 and 1952 recovered remains of several Upper Republican earthlodges. These investigations have never been written up although over 2,000 artifacts are presently curated by the University of Nebraska at Lincoln. These excavations were confined to the earthlodges and not the adjacent midden areas. The overlying, culturally sterile, soils were removed to expose the underlying cultural midden. Present investigations determined the presence of a midden to the east of previous investigations. Excavation of four contiguous 1 X 1 meter units determined the midden to extend from surface to a maximum depth of 80 cm. The midden contains lithics, ceramics, faunal, botanical and human remains. The site was originally estimated to be about 450 square meters and the present investigations indicate approximately 150 square meters remain.

While much is known regarding Upper Republican settlement patterns and house structures, little is known about subsistence strategies. Things not known about subsistence strategies include the variety of fauna and flora used, the types of plants cultivated, season of resource exploitation and seasonal occupation of the hamlets and villages.

The excellent preservation of bone makes the site ideal for the study of subsistence economics of Upper Republican peoples. Faunal data recovered from 25HN36 (see Chapters 7.1 and 10) suggest seasonal occupation of the site perhaps during the Spring and/or Fall. This is based on the presence of a large variety and number of migratory waterfowl and young fish. The young fish may be attributed to seasonal migration and spawning. In addition, the low frequency of large mammals (e.g., bison, deer and pronghorn) suggests possible abandonment of the earthlodges for conducting seasonal hunts on the High Plains. This pattern is well documented by ethnographic data for historic Plains tribes. A dual subsistence economy including both hunting and gardening is revealed at 25HN36 by the presence of a domesticated variety of the native sunflower. The domestication of this plant is well documented in the Central Plains beginning about A. D. 900 but is unfortunately not well represented in Upper Republican deposits. In all probability, other plants, both native and tropical, were domesticated by the prehistoric inhabitants of this site. This dual subsistence strategy should be tested at Upper Republican sites and 25HN36 offers the potential for supplying significant information regarding this strategy. This is possible because of the preservation of the midden area that is east of the excavated earthlodges.

Flotation would provide a far better data base for the reconstruction of diet. Such a technique was not used when many Upper Republican sites were excavated in the 1950's. For example, what was the relative importance of fish and amphibians? What species were used? Although agricultural foods provided a major part of the diet, what wild plant foods were gathered? What indigenous plants were cultivated? Do the floral and faunal remains provide any evidence that occupation at the site was seasonal? Could the village have been abandoned for annual bison hunts as was the practice in early historic times? Were the Upper Republican people involved in a trade network (e.g., for chert, copper, ceramics, etc.)?

Analyses of artifacts recovered from the earthlodges in conjunction with further investigations of the remaining midden area would greatly enhance knowledge of human occupation of the High Plains during the Plains Village period. Although only a small portion of site 25HN36 remains, it is the judgement of the archaeologists that this remaining area is potentially significant and therefore warrants further investigation. The potential significance lies in the fact that extra-mural midden areas of Upper Republican sites have rarely been investigated but yet are often extremely valuable in yielding data pertinent to a reconstruction of subsistence. Tests at 25HN36 indicate this midden area may have been for trash disposal which may account for the recovery of a large amount of faunal remains. These remains, retrieved mainly by flotation, may not be represented in midden deposits inside the earth lodges. Therefore, to exclude them from analysis and a reconstruction of subsistence would result in an incomplete understanding of this cultural practice.

White Cat Village (25HN37)

Previous investigations at the site include work from 1946 to 1980 (see Chapter 7.1). Excavations have yielded eight earthlodges, over 200 features and more than 10,000 artifacts. Artifacts include, but are not limited to, turquoise beads and pendants, obsidian flakes and tools, glazed painted ceramics, Olivella shell beads and an iron axe head. These indicate contact with both southwestern Puebloan and Euro-American cultures. It is known that at least the material recovered from the 1952, and possibly other excavations, have never been analyzed nor written up. Knowledge of proto-historic use of the High Plains by Dismal River peoples (Apache) can be greatly enhanced by analyses of these materials.

The most recent investigations prior to this project (Roetzel et al. 1982) were unsuccessful in locating in situ cultural remains. Present investigations (see Chapter 7.1) recovered remains of an in situ baking pit with associated artifacts suggesting the previous investigation had mis-located the site. The site is not located on the beach nor has it been completely destroyed by erosion (see Roetzel et al. 1982:88) as previously indicated, but rather, is situated on a terrace above the normal pool level. The site size was originally estimated to be 14,200 square meters. Present surface evidence and test excavations indicate about 8,000 square meters of the site remains. It is difficult to determine how much of this 8000 square meters is undisturbed. Excavations conducted between 1948 and 1952 were fairly extensive; however, no records or site maps survive to indicate the precise location or extent of these previous investigations. Test excavations indicate a plow zone extending from the surface to about 18 cm deep. Cultural remains extend 10 cm to 12 cm below plowzone. The excavated baking pit, feature 1, extended to a depth of 39 cm. Results of these investigations clearly indicate in situ cultural features and deposits are present. Despite extensive excavations in the past, state-of-the-art data recovery and analyses would allow issues to be addressed that could not be considered before.

The following issues could be addressed by future researchers at White Cat Village. What importance were agricultural foods in the diet? Were crops grown by Dismal River peoples or were they an item of trade or both? Was trade conducted with populations in the Southwest or eastern Plains? The type of maize (row number, cupule size, cob size) would all be good indicators of maize varieties. If trade was with the Southwest, were new varieties of squash introduced into the Central Plains (particularly Cucurbita *mixta* and *C. moschata*, earlier remains of squash in Central Plains sites is *C. pepo*)? Was occupation of White Cat Village permanent and year-round? Dismal River peoples are thought to have been less sedentgary than other Late Ceramic period societies. This needs to be clarified. Was early contact with these people initiated by the French (e.g., fur trading) or Spanish (e.g., out of Mexico)? Euro-American contact artifacts recovered from the site do not provide conclusive information (see Wedel 1986:145).

25HN40

Previous investigations (Pepperl and Falk 1978; Roetzel et al. 1982) and those of this study indicate portions of the site are in situ. Present investigations revealed a trash filled storage pit and several possible post stains. Although the site has been cultivated in the past, the plow zone extends to approximately 18 cm below surface with cultural remains extending to a depth of 30 cm. Therefore, in situ cultural features and remains occur below plow zone.

According to analyses of ceramics (see Chapter 9) the occupation at this site can be attributed to the Plains Woodland Keith complex. Excavations at 25HN12 also revealed a Keith complex occupation and this has been substantiated by ceramic analyses and radiocarbon dates. At 25HN12, however, cultural material is confined to the plow zone with the exception of truncated features (see Chapter 7.1). Therefore, it is apparent that in situ deposits are not present at 25HN12 which is in contrast with those at 25HN40. Consequently more information about the poorly understood Keith complex is potentially available through data recovery at 25HN40. Based on surface observations and test excavations the site size is approximately 7,000 square meters. Since previous research has been surficial, the site has not been severely disturbed with the exception of extensive shoreline erosion on the south edge.

The following are some of the issues and questions that could be addressed by future researchers conducting work at site 25HN40. What is the nature of the occupation? Is it seasonal, semi-permanent, or permanent? Are there any remains of structures that could help clarify the approximate size of the population inhabitating the site? How does this compare with other Plains Woodland complexes? Are any domesticated plants present in the assemblage (includes both tropical and indigenous plants)? What wild plant foods are represented? Can the relationship between the Keith and Valley complexes be better delineated with an increase in the artifact inventory? The temporal dimensions of the Keith complex have already been refined with the addition of the two radiocarbon dates from 25HN12. Can the spatial dimensions of this complex be better defined with an increase in the artifact inventory? Can regional variability be delineated in the tool assemblage?

Summary

This report is the result of a project in which 28 prehistoric and historic sites in Harlan County, Nebraska were tested for National Register eligibility. The sites investigated were Graham Ossuary (25HN5), 25HN6, 25HN12, 25HN14, Sindt Point (25HN16), Stevenson Village (25HN31), 25HN32, 25HN33, 25HN35, 25HN36, White Cat Village (25HN37), Indian Hill (25HN42), School District No. 9 (25HN50), 25HN51, 25HN52, 25HN53, 25HN54, 25HN57, 25HN60, 25HN61, 25HN62, 25HN124, 25HN125, North Cove (25HN164), and Buffalo Bill's Cave. Due to the complexity of several of the sites, in particular the North Cove site, the project was guided by a multi-discliplinary approach that included archaeologists, paleontologists, historians, geomorphologist, and palynologist.

Results of this testing project revealed a possible Paleo-Indian occupation in association with Late Pleistocene fauna and flora at the North Cove site (25HN164), intact cultural features assigned to the Keith complex at 25HN40, habitation refuse and burial remains representative of the Upper Republican complex at 25HN36 and Graham Ossuary (25HN5), and intact features assigned to the Dismal River Plains Apache complex at White Cat Village (25HN37). The last four sites were considered most significant and were recommended for inclusion in the National Register of Historic Places. Research questions that could be addressed at each of these sites were delineated. Recommendations were also made to the U.S. Army Corps of Engineers for immediate and long term management actions that would mitigate any further loss to the cultural resources, (see Background Data Volume).

Glossary

Achene - A complete seed, including the inner kernel and outer pericarp or shell.

Anteroconid - Anterior part of tooth cusp.

Arris - The intersection of two surfaces forming a crest or spine formed by unifacial or bifacial flaking. The longitudinal lines of an artifact that is rhomboidal in transverse section (Crabtree 1972).

Artifact - Any object altered or used by humans.

Arvicolids - Voles, mammals.

Biogenic Opal - Silicious body particle of plants.

Bulliforms - Type of plant cell.

Catostomids - Suckers, fish.

Cementum - Part of a tooth.

Chloridoid tribe - Xeric, short grasses.

Chrysostomate cysts - Algae-like silicious shell, plant part.

Complex - Refers to a cultural manifestation without being committal to any particular taxonomic designation.

Culture - All learned behavior that serves to organize individuals into a community or society.

Cut bank - An exposed vertical soil column resulting from wave action, erosion and road cuts.

Cyprinids - Minnows.

Diagnostic artifact - An item representative of a particular culture or time period.

Diatoms - Skeletons of plants.

Eragrostoideae subfamily - Cool weather grasses.

Erralieure - An enigmatic flake formed between the bulb of force and the bulbar scar. The erralieure flake is convex, concave (Crabtree 1972).

Feature - The location of specific activities (e.g., fire-pits, storage pits, petroglyphs, burials) that are recognized only in the field.

Flotation - Water separation of heavy soils from light plant and animal remains.

Foramen - A hole in a bone.

Four (4)-element M2 - A second molar with four cusps.

Frontoparietals - The frontal and parietal bones of the skull of an animal.

Geomyid - Pocket gophers.

Holocene - Recent, or post-glacial epoch dating from 10,000 B.C.

Ictalurid - Catfish.

Infraspinous fossa - Portion of a scapula blade.

Lagomorph - Rabbits and hares.

Lingual reentrants of M3 - Pertaining to enamel fold on the tongue side of the third molar.

Lobate - Phytolith with lobes.

Loph - Tooth fold.

M1 - First molar.

M2 - Second molar.

M3 - Third molar.

M1-3 - First through third molars.

Macrobotanical - All plant remains that can be seen with the unaided eye but that are usually identified with a microscope.

Macrofaunal - All animal remains that can be seen with the unaided eye.

MNI - Minimum number of individuals.

NISP - Number of identified specimens.

Paleosol - A buried soil horizon of a prior land surface.

Panicoideae - Type of grasses.

Parietal spurs - Bony ridges on the parietal bone of the skull of animals.

Pleistocene - The most recent geologic epoch, known as the Ice Age.

Poaceae - Grasses.

Posterior - Pertaining to the rear or back of an object.

Potlid - A plano-convex flake that leaves a concave scar. They result from differential expansion and contraction of lithic material caused by heating (Crabtree 1972).

Profile - A schematic drawing representing soil stratigraphy.

Quaternary - A geologic period consisting of both the Pleistocene and Holocene epochs.

Sciurids - Squirrels.

Site - Any location of human activity.

Spong spicules - Silicious particles, internal skeleton, part of a plant.

Stizostedion - Sauger.

Stratigraphy - The arrangement of soil strata.

Topotypic - Pertaining to the typical.

Tricomes - Vascular system of a plant cell.

Vaulting - Arched.

Wisconsinan - The last major glacial advance of the Ice Age dating from 90,000 B.C. to 10,000 B.C.

Zapodid - Jumping mice.

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Appendix A

Summary Statistics for Stone Tools

Table A.1
25HN5
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	13.28	13.21	4.04	2.57
standard deviation	6.10	6.05	2.72	6.63
specimen number	58	58	58	92

all unmodified artifacts

	complete	proximal	medial	distal
flakes	59	20	42	27
blades	1		1	
potlids	1			
shatter	92			

	primary	secondary	interior
flakes	23	37	88
blades	1		1
potlids			1
shatter	22	34	36

	heated	not heated
flakes	24	124
blades		2
potlids	1	
shatter	24	68

	raw material
flakes	9 Permian chert
	139 Niobrarite
blades	2 Niobrarite
potlids	1 Niobrarite
shatter	1 Permian chert
	90 Niobrarite
	1 green quartzite

Table A.2
25HN6
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	11.98	10.95	3.36	0.44
standard deviation	3.84	4.70	1.74	0.49
specimen number	11	11	11	5

all unmodified artifacts

	complete	proximal	medial	distal
flakes	10	6	10	4
blades	1		1	
shatter	5			

	primary	secondary	interior
flakes	6	5	19
blades	1		1
shatter		1	4

	heated	not heated
flakes	7	23
blades		2
shatter	3	2

	raw material
flakes	1 Permian chert
	27 Niobrarite
	1 green quartzite
	1 local chalcedony
blades	2 Niobrarite
shatter	5 Niobrarite

Table A.3
25HN6
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	17.00	17.60	5.95	2.93
standard deviation	11.31	7.35	5.16	4.63
specimen number	2	2	2	10

all unmodified artifacts

	complete	proximal	medial	distal
flakes	2	1		
shatter	10			

	primary	secondary	interior
flakes		1	2
shatter	1	2	7

	heated	not heated
flakes		3
shatter	2	8

	raw material
flakes	3 Niobrarite
shatter	10 Niobrarite

Table A.4
25HN12
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	15.74	12.40	2.90	16.07
standard deviation	2.92	3.00	1.38	8.84
specimen number	5	5	5	3

all unmodified artifacts

	complete	proximal	medial	distal
flakes	5		2	3
shatter	2			

	primary	secondary	interior
flakes			11
shatter		3	

	heated	not heated
flakes	2	9
shatter		3

	raw material
flakes	2 Permian chert
	9 Niobrarite
shatter	1 Permian chert
	2 Niobrarite

Table A.5
25HN12
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	14.98	13.74	3.34	25.32
standard deviation	9.09	6.33	1.94	38.70
specimen number	10	10	10	6

all unmodified artifacts

	complete	proximal	medial	distal
flakes	10	7	8	1
shatter	6			

	primary	secondary	interior
flakes		2	24
shatter	1	1	1

	heated	not heated
flakes	2	9
shatter		3

	raw material
flakes	2 Permian chert 9 Niobrarite
shatter	1 Permian chert 2 Niobrarite

Table A.6
25HN16
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	12.48	9.11	1.80	
standard deviation				
specimen number	1	1	1	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1	1		1

	primary	secondary	interior
flakes			3

	heated	not heated
flakes	1	2

	raw material
flakes	2 Niobrarite 1 local chalcedony

Table A.7
25HN16
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	19.57	17.80	3.82	3.39
standard deviation	5.13	6.90	1.72	3.55
specimen number	20	20	20	7

all unmodified artifacts

	complete	proximal	medial	distal
flakes	20	33	27	11
blades			1	
shatter	7			

	primary	secondary	interior
flakes	4	8	79
blades			1
shatter		3	

	heated	not heated
flakes	17	74
blades		1
shatter		7

	raw material
flakes	87 Niobrarite
	2 Flattop Chalcedony, Colorado
	1 Flattop Chalcedony, SW South Dakota
	1 local chalcedony
blades	1 Niobrarite
shatter	7 Niobrarite

Table A.8
25HN31
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	13.81	11.66	3.55	0.92
standard deviation	8.14	5.51	3.12	1.51
specimen number	15	15	15	14

all unmodified artifacts

	complete	proximal	medial	distal
flakes	13	11	14	11
blades	2	1		
shatter	14			

	primary	secondary	interior
flakes	5	6	38
blades		1	2
shatter	5	2	7

	heated	not heated
flakes	2	47
blades		3
shatter		14

	raw material
flakes	49 Niobrarite
blades	3 Niobrarite
shatter	14 Niobrarite

Table A.9
25HN31
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	15.40	23.00	2.80	43.30
standard deviation				
specimen number	1	1	1	1

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1		1	
potlids	1			
shatter	1			

	primary	secondary	interior
flakes			2
potlids			1
shatter		1	

	heated	not heated
flakes		2
potlids	1	
shatter		1

	raw material
flakes	2 Niobrarite
potlids	1 Niobrarite
shatter	1 Niobrarite

Table A.10
25HN32
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	11.48	11.70	2.40	
standard deviation	1.0[illegible]	4.35	0.97	
specimen number	4	4	4	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	4	2		3

	primary	secondary	interior
flakes	1	1	7

	heated	not heated
flakes	1	8

	raw material
flakes	9 Niobrarite

Table A.11
25HN33
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	16.32	14.46	3.69	3.03
standard deviation	7.71	6.65	3.14	4.61
specimen number	12	12	12	4

all unmodified artifacts

	complete	proximal	medial	distal
flakes	12		3	3
blades			1	
shatter	4			

	primary	secondary	interior
flakes	3	1	15
blades			1
shatter	3		1

	heated	not heated
flakes		18
blades		1
shatter		4

	raw material
flakes	18 Niobrarite
blades	1 Niobrarite
shatter	4 Niobrarite

Table A.12
25HN33
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average				
standard deviation				
specimen number				

all unmodified artifacts

	complete	proximal	medial	distal
flakes		1		2

	primary	secondary	interior
flakes		1	2

	heated	not heated
flakes		3

	raw material
flakes	3 Niobrarite

Table A.13
25HN35
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average				
standard deviation				
specimen number				

all unmodified artifacts

	complete	proximal	medial	distal
flakes			2	

	primary	secondary	interior
flakes			2

	heated	not heated
flakes	1	1

	raw material
flakes	2 Niobrarite

Table A.14
25HN36
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	15.37	13.48	2.74	0.90
standard deviation	8.13	6.50	1.67	1.34
specimen number	219	219	219	101

all unmodified artifacts

	complete	proximal	medial	distal
flakes	217	91	208	51
blades		1		
potlids	33			
shatter	101			

	primary	secondary	interior
flakes	13	13	541
blades			1
potlids		1	32
shatter	7	10	84

	heated	not heated
flakes	80	488
blades		1
potlids	33	
shatter	20	81

	raw material
flakes	1 Permian chert
	563 Niobrarite
	1 green quartzite
blades	1 Niobrarite
potlids	33 Niobrarite
shatter	1 Permian chert
	98 Niobrarite
	1 local chalcedony

Table A.15
25HN36
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	20.00	15.00	2.40	
standard deviation				
specimen number	1	1	1	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1	1	1	1
potlids	1			

	primary	secondary	interior
flakes			4
potlids			1

	heated	not heated
flakes	1	3
potlids	1	

	raw material
flakes	4 Niobrarite
potlids	1 Niobrarite

Table A.16
25HN37
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.84	11.28	2.93	6.36
standard deviation	3.65	3.43	1.21	12.88
specimen number	31	31	31	7

all unmodified artifacts

	complete	proximal	medial	distal
flakes	32	7	12	13
shatter	7			

	primary	secondary	interior
flakes	2	6	56
shatter	3	2	2

	heated	not heated
flakes	2	62
shatter		7

	raw material
flakes	4 Permian chert
	56 Niobrarite
	1 green quartzite
	1 local chalcedony
	2 Flattop Chalcedony, Colorado
shatter	7 Niobrarite

Table A.17
25HN37
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	18.29	17.20	4.07	15.14
standard deviation	8.47	7.56	2.57	108.84
specimen number	271	271	271	221

all unmodified artifacts

	complete	proximal	medial	distal
flakes	267	128	77	146
blades	5			1
potlids	6			
shatter	220			

	primary	secondary	interior
flakes	11	49	558
blades		2	
potlids		1	5
shatter	17	55	148

	heated	not heated
flakes	30	588
blades		6
potlids	6	
shatter	20	200

raw material

flakes	26 Permian chert
	585 Niobrarite
	5 Flattop Chalcedony, Colorado
	2 Flattop Chalcedony, SW South Dakota
blades	2 Permian chert
	4 Niobrarite
potlids	6 Niobrarite
shatter	4 Permian chert
	215 Niobrarite
	1 local chalcedony

Table A.18
25HN38
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	11.43	16.73	3.60	0.25
standard deviation	4.81	5.60	1.71	0.21
specimen number	4	4	4	2

all unmodified artifacts

	complete	proximal	medial	distal
flakes	4	3	4	4
shatter	2			

	primary	secondary	interior
flakes	1	1	13
shatter			2

	heated	not heated
flakes	3	12
shatter		2

	raw material
flakes	15 Niobrarite
shatter	2 Niobrarite

Table A.19
25HN38
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	24.73	20.85	6.18	3.50
standard deviation	15.82	9.98	4.33	5.73
specimen number	32	32	32	46

all unmodified artifacts

	complete	proximal	medial	distal
flakes	30	20	17	8
blades	2	1	1	
potlids	1			
shatter	46			

	primary	secondary	interior
flakes	1	5	69
blades		1	3
potlids			1
shatter		11	35

	heated	not heated
flakes	2	73
blades		4
potlids	1	
shatter	5	41

	raw material
flakes	75 Niobrarite
blades	4 Niobrarite
potlids	1 Niobrarite
shatter	46 Niobrarite

Table A.20
25HN39
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	14.80	12.54	2.72	1.23
standard deviation	8.02	6.50	1.71	1.88
specimen number	27	27	27	20

all unmodified artifacts

	complete	proximal	medial	distal
flakes	27	7	14	23
blades			3	
potlids	1			
shatter	21			

	primary	secondary	interior
flakes	2	3	66
blades			3
potlids			1
shatter	3	3	15

	heated	not heated
flakes	1	70
blades		3
potlids	1	
shatter	1	20

	raw material
flakes	1 Permian chert
	70 Niobrarite
blades	2 Niobrarite
	1 local chalcedony
potlids	1 Niobrarite
shatter	21 Niobrarite

Table A.21
25HN40
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.60	11.89	2.56	0.99
standard deviation	4.97	3.67	1.14	3.26
specimen number	140	140	140	70

all unmodified artifacts

	complete	proximal	medial	distal
flakes	142	83	79	108
blades	4		1	
potlids	12			
shatter	70			

	primary	secondary	interior
flakes	8	18	386
blades			5
potlids	1	1	10
shatter	5	14	51

	heated	not heated
flakes	45	367
blades		5
potlids	12	
shatter	9	61

	raw material
flakes	8 Permian chert
	399 Niobrarite
	1 green quartzite
	2 Flattop Chalcedony, Colorado
	1 quartz
blades	5 Niobrarite
potlids	12 Niobrarite
shatter	1 Permian chert
	68 Niobrarite
	1 local chalcedony

Table A.22
25HN40
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	15.40	14.37	3.23	3.36
standard deviation	7.49	7.12	2.07	5.03
specimen number	41	41	41	18

all unmodified artifacts

	complete	proximal	medial	distal
flakes	43	16	23	20
potlids	1			
shatter	22			

	primary	secondary	interior
flakes	3	5	94
potlids			1
shatter		1	21

	heated	not heated
flakes	6	96
potlids	1	
shatter	2	20

	raw material
flakes	2 local chalcedony
	99 Niobrarite
	1 cf. Alibates
potlids	1 Niobrarite
shatter	22 Niobrarite

Table A.23
25HN42
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.49	12.13	3.40	1.17
standard deviation	4.62	4.31	1.86	3.43
specimen number	278	278	278	469

all unmodified artifacts

	complete	proximal	medial	distal
flakes	279	142	113	125
potlids	7			
shatter	466			

	primary	secondary	interior
flakes	66	82	511
potlids			7
shatter	70	139	257

	heated	not heated
flakes	29	630
potlids	7	
shatter	23	443

	raw material
flakes	1 quartz
	652 Niobrarite
	3 local chalcedony
	2 Flattop Chalcedony, Colorado
	1 cf. Alibates
potlids	7 Niobrarite
shatter	2 green quartzite
	460 Niobrarite
	1 solid quartzite, Spanish diggings
	3 local chalcedony

Table A.24
25HN42
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	11.20	6.70	2.80	
standard deviation				
specimen number	1	1	1	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1	1	1	2

	primary	secondary	interior
flakes	1	1	3

	heated	not heated
flakes		5

	raw material
flakes	5 Niobrarite

Table A.25
25HN50
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.93	12.29	2.96	1.91
standard deviation	5.56	5.80	1.46	5.20
specimen number	38	38	38	22

all unmodified artifacts

	complete	proximal	medial	distal
flakes	37	11	11	20
blades	1	1		
potlids	3			
shatter	23			

	primary	secondary	interior
flakes	6	5	68
blades		1	1
potlids			3
shatter	2	3	18

	heated	not heated
flakes	5	78
blades		2
potlids	3	
shatter	1	22

	raw material
flakes	1 local chalcedony
	78 Niobrarite
blades	2 Niobrarite
potlids	3 Niobrarite
shatter	23 Niobrarite

Table A.26
25HN50
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	13.06	14.08	2.36	10.03
standard deviation	6.57	8.68	1.29	
specimen number	5	5	5	1

all unmodified artifacts

	complete	proximal	medial	distal
flakes	5	4	3	5
blades		1		
shatter	1			

	primary	secondary	interior
flakes			17
blades			1
shatter			1

	heated	not heated
flakes	1	16
blades		1
shatter		1

	raw material
flakes	17 Niobrarite
blades	1 Niobrarite
shatter	1 Niobrarite

Table A.27
25HN51
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	13.15	12.29	2.76	0.47
standard deviation	5.45	4.42	1.76	0.74
specimen number	92	92	92	47

all unmodified artifacts

	complete	proximal	medial	distal
flakes	93	65	68	55
blades	1	1		1
potlids	2			
shatter	47			

	primary	secondary	interior
flakes	6	13	262
blades			3
potlids			2
shatter	4	5	38

	heated	not heated
flakes	6	275
blades		3
potlids	2	
shatter	1	46

	raw material
flakes	4 Permian chert
	263 Niobrarite
	14 local chalcedony
blades	3 Niobrarite
potlids	2 Niobrarite
shatter	1 Permian chert
	45 Niobrarite
	1 local chalcedony

Table A.28
25HN52
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average				2.50
standard deviation				
specimen number				1

all unmodified artifacts

	complete	proximal	medial	distal
flakes		1	3	1
shatter	1			

	primary	secondary	interior
flakes		2	3
shatter		1	

	heated	not heated
flakes		5
shatter		1

	raw material
flakes	5 Niobrarite
shatter	1 Niobrarite

Table A.29
25HN52
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	30.38	24.36	4.34	7.82
standard deviation	25.33	18.13	2.47	6.01
specimen number	5	5	5	4

all unmodified artifacts

	complete	proximal	medial	distal
flakes	5	11	11	6
blades		2		
shatter	4			

	primary	secondary	interior
flakes		2	31
blades			2
shatter		1	3

	heated	not heated
flakes	2	31
blades		2
shatter		4

	raw material
flakes	33 Niobrarite
blades	2 Niobrarite
shatter	4 Niobrarite

Table A.30
25HN53
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	9.00	11.70	3.00	3.15
standard deviation				0.21
specimen number	1	1	1	2

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1	1		
shatter	2			

	primary	secondary	interior
flakes			2
shatter			2

	heated	not heated
flakes		2
shatter		2

	raw material
flakes	1 Permian chert
	1 Niobrarite
shatter	2 Permian chert

Table A.31
25HN53
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	14.50	13.50	3.65	3.50
standard deviation	5.80	6.36	3.32	1.06
specimen number	2	2	2	3

all unmodified artifacts

	complete	proximal	medial	distal
flakes	2	1	1	1
shatter	3			

	primary	secondary	interior
flakes			5
shatter		1	2

	heated	not heated
flakes		5
shatter		3

	raw material
flakes	5 Permian chert
shatter	3 Permian chert

Table A.32
25HN54
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	13.50	9.50	2.50	
standard deviation				
specimen number	1	1	1	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1			

	primary	secondary	interior
flakes			1

	heated	not heated
flakes		1

	raw material
flakes	1 Niobrarite

Table A.33
25HN54
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	16.27	14.89	3.57	1.32
standard deviation	5.62	7.31	1.66	1.82
specimen number	34	34	34	20

all unmodified artifacts

	complete	proximal	medial	distal
flakes	34	20	9	16
shatter	21			

	primary	secondary	interior
flakes	5	4	70
shatter	6	2	13

	heated	not heated
flakes	8	71
shatter	2	19

	raw material
flakes	1 local chalcedony
	78 Niobrarite
shatter	1 Ogallala Formation Petrified Wood
	20 Niobrarite

Table A.34
25HN57
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	9.43	8.86	2.21	0.59
standard deviation	2.45	2.85	0.87	1.26
specimen number	27	27	27	17

all unmodified artifacts

	complete	proximal	medial	distal
flakes	27	12	19	15
blades			1	
potlids	3			
shatter	17			

	primary	secondary	interior
flakes	4	8	61
blades			1
potlids		1	2
shatter	4	1	12

	heated	not heated
flakes	6	67
blades	1	
potlids	3	
shatter	1	16

	raw material
flakes	73 Niobrarite
blades	1 Niobrarite
potlids	3 Niobrarite
shatter	17 Niobrarite

Table A.35
25HN57
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average				0.70
standard deviation				
specimen number				1

all unmodified artifacts

	complete	proximal	medial	distal
flakes		4	3	2
shatter	1			

	primary	secondary	interior
flakes			9
shatter			1

	heated	not heated
flakes	2	7
shatter		1

	raw material
flakes	9 Niobrarite
shatter	1 Niobrarite

Table A.36
25HN60
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	11.50	12.30	2.00	0.20
standard deviation				0.17
specimen number	1	1	1	3

all unmodified artifacts

	complete	proximal	medial	distal
flakes	1	2	3	3
shatter	3			

	primary	secondary	interior
flakes		1	8
shatter		1	2

	heated	not heated
flakes	2	7
shatter	1	2

	raw material
flakes	9 Niobrarite
shatter	3 Niobrarite

Table A.37
25HN60
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.80	11.31	2.40	0.36
standard deviation	6.08	5.01	0.73	0.31
specimen number	7	7	7	5

all unmodified artifacts

	complete	proximal	medial	distal
flakes	7	5	5	4
shatter	5			

	primary	secondary	interior
flakes		1	20
shatter		1	4

	heated	not heated
flakes	5	16
shatter	1	4

	raw material
flakes	2 Permian chert
	19 Niobrarite
shatter	5 Niobrarite

Table A.38
25HN61
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	10.70	10.15	1.90	0.99
standard deviation	2.40	0.21	0.14	1.18
specimen number	2	2	2	22

all unmodified artifacts

	complete	proximal	medial	distal
flakes	2	5	11	5
shatter	22			

	primary	secondary	interior
flakes	1	8	14
shatter	2	14	6

	heated	not heated
flakes	1	22
shatter	1	21

	raw material
flakes	1 cf. Alibates
	22 Niobrarite
shatter	22 Niobrarite

Table A.39
25HN61
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average	14.32	14.06	8.40	2.01
standard deviation	4.46	3.90	5.64	2.21
specimen number	5	5	5	22

all unmodified artifacts

	complete	proximal	medial	distal
flakes	5	7	5	1
shatter	9			

	primary	secondary	interior
flakes	1	2	15
shatter	1	3	5

	heated	not heated
flakes	1	17
shatter		9

raw material

flakes	1 green quartzite
	16 Niobrarite
	1 Flattop Chalcedony, Colorado
shatter	9 Niobrarite

Table A.40
25HN62
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	12.97	11.56	3.05	1.00
standard deviation	4.40	3.68	1.36	2.20
specimen number	139	139	139	142

all unmodified artifacts

	complete	proximal	medial	distal
flakes	137	78	100	67
blades	2			
potlids	15			
shatter	140			

	primary	secondary	interior
flakes	38	71	273
blades	1		1
potlids		1	14
shatter	19	56	65

	heated	not heated
flakes	27	355
blades		2
potlids	15	
shatter	14	126

	raw material
flakes	4 Permian chert
	368 Niobrarite
	1 Flattop Chalcedony, SW South Dakota
	1 local chalcedony
	1 Ogallala Formation Petrified Wood
blades	2 Niobrarite
potlids	15 Niobrarite
shatter	4 local chalcedony
	135 Niobrarite
	1 green quartzite

Table A.41
25HN62
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	17.67	16.85	5.55	1.43
standard deviation	4.39	7.19	2.65	1.71
specimen number	13	13	13	15

all unmodified artifacts

	complete	proximal	medial	distal
flakes	13	6	16	4
potlids	1			
shatter	15			

	primary	secondary	interior
flakes	5	5	29
potlids		1	
shatter	1	3	11

	heated	not heated
flakes	10	29
potlids	1	
shatter	5	10

	raw material
flakes	39 Niobrarite
potlids	1 Niobrarite
shatter	15 Niobrarite

Table A.42
25HN124
Excavated

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average				0.10
standard deviation				
specimen number				1

all unmodified artifacts

	complete	proximal	medial	distal
flakes		4	1	
shatter	1			

	primary	secondary	interior
flakes			5
shatter			1

	heated	not heated
flakes		5
shatter		1

	raw material
flakes	5 Niobrarite
shatter	1 Niobrarite

Table A.43
25HN125
Excavated

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	14.35	12.15	2.80	0.15
standard deviation	5.76	4.35	1.35	0.07
specimen number	22	22	22	2

all unmodified artifacts

	complete	proximal	medial	distal
flakes	21	9	7	4
blades	1			
potlids	1			
shatter	2			

	primary	secondary	interior
flakes	5	3	33
blades			1
potlids		1	
shatter		1	1

	heated	not heated
flakes	4	37
blades		1
potlids	1	
shatter		2

	raw material
flakes	1 Permian chert
	39 Niobrarite
	1 local chalcedony
blades	1 Niobrarite
potlids	1 Niobrarite
shatter	2 Niobrarite

Table A.44
25HN125
Surface

complete artifacts

	flakes length	flakes width	flakes thickness	shatter weight
mean average	15.83	16.50	4.50	
standard deviation	7.08	5.62	0.44	
specimen number	3	3	3	

all unmodified artifacts

	complete	proximal	medial	distal
flakes	3			

	primary	secondary	interior
flakes			3

	heated	not heated
flakes		3

	raw material
flakes	3 Niobrarite

Table A.45
25HN164
Surface

complete artifacts

	flakes			shatter
	length	width	thickness	weight
mean average				
standard deviation				
specimen number				

all unmodified artifacts

	complete	proximal	medial	distal
flakes		2		

	primary	secondary	interior
flakes		1	1

	heated	not heated
flakes		2

	raw material
flakes	2 Niobrarite

Appendix B

Summary Tables of Faunal Remains and Human Remains

Table B.1

Vertebrate Faunal Assemblage: 25HN5

Colubridae (Non-venomous Snakes)
Unit 8, Level 10 (100-120 cm): 2 vertebrate fragments

Testudinata (Turtles)
Unit 7, Level 3 (20-30 cm): 1 vertebra fragment

Lepus sp. (Jack Rabbit)
Unit 7, Level 3 (20-30 cm): 1 femur fragment

Table B.2

Human Skeletal Remains: 25HN5 (Graham Ossuary)

<u>Unit 5</u>

Level 2 (10-20 cm): 13 fragments
Level 3 (20-30 cm): 5 fragments
Level 4 (30-40 cm): 7 fragments

<u>Unit 6</u>

Level 2 (10-20 cm): 4 fragments
Level 3 (20-30 cm): 1 upper P2 fragment, 6 fragments

<u>Unit 7</u>

Level 1 (0-10 cm): 1 deciduous molar fragment, 1 vertebra fragment, 1 phalanx fragment, 1 3rd metatarsal, 38 fragments

Level 2 (10-20 cm): 1 skull fragment, 1 lower P1, 1 lower M1, 2 vertebrae fragments, 5 rib fragments, 1 long bone fragment, 1 proximal phalanx of hand, 91 fragments

Level 3 (20-30 cm): 1 upper I1 fragment, 1 upper I2, 1 upper canine fragment, 1 upper P2 fragment, 2 lower P1s, 1 tooth fragment, 1 skull fragment, 1 mandible fragment, 9 vertebrae fragments, 8 rib fragments, 2 scapula fragments, 2 scaphoids, 1 triquetral, 1 pisiform, 1 1st metacarpal fragment, 1 4th metacarpal fragment, 1 proximal phalanx fragment of hand, 1 distal phalanx of thumb, 1 phalanx fragment of hand, 2 pubis fragments, 1 patella, 1 long bone fragment, 1 proximal phalanx fragment of foot, 132 fragments

Level 4 (30-40 cm): 1 skull fragment, 1 upper M3, 7 vertebrae fragments, 5 rib fragments, 1 proximal phalanx of hand, 1 proximal phalanx fragment of hand, 1 fibula fragment, 1 long bone fragment, 1 metatarsal, 1 middle phalanx of foot, 1 distal phalanx of foot, 1 phalanx fragment, 83 fragments

Level 5 (40-60 cm): 2 skull fragments, 1 lower P2, 1 cervical vertebra, 1 vertebra fragment, 8 rib fragments, 1 clavicle fragment, 1 proximal phalanx fragment of hand, 1 ilium fragment, 1 navicular, 1 tarsal, 1 metatarsal, 1 proximal phalanx of foot, 71 fragments

Level 6 (60-70 cm): 1 skull fragment, 1 mandible fragment, 1 upper M3, 1 lower molar fragment, 1 incisor fragment, 1 molar fragment, 1 atlas vertebra, 7 rib fragments, 1 scaphoid, 1 proximal phalanx of foot, 1 phalanx fragment, 37 fragments

Table B.2 cont.

Level 7 (70-80 cm): 2 skull fragments, 1 maxilla fragment, 1 upper I2 fragment, 1 upper premolar root (extremely worn), 1 lower molar fragment, 2 vertebrae fragments, 5 rib fragments, 1 ulna fragment, 1 long bone fragment, 1 metapodial fragment, 1 phalanx fragment, 19 fragments

Level 8 (80-90 cm): 1 lower molar fragment, 1 tooth fragment, 5 vertebrae fragments, 6 rib fragments, 1 4th metacarpal, 1 phalanx fragment of foot, 33 fragments

Level 9 (90-100 cm): 2 skull fragments, 1 lower premolar fragment, 6 vertebrae fragments, 1 1st rib, 1 rib fragment, 1 clavicle fragment, 2 scapula fragments, 2 proximal phalanges of hand, 1 phalanx fragment of hand, 1 hamate, 1 ilium, 1 metapodial fragment, 1 proximal phalanx of foot, 55 fragments

<u>Unit 8</u>

Level 1 (0-10 cm): 1 upper P2, 2 vertebra fragments, 1 rib fragment, 1 3rd cuneiform, 24 fragments

Level 2 (10-20 cm): 1 upper canine, 1 upper M3, 2 vertebrae fragments, 1 1st metacarpal, 1 patella fragment, 1 metapodial fragment, 2 phalanx fragments, 66 fragments

Level 3 (20-30 cm): 2 skull fragments, 1 upper I1, 2 upper canines, 1 deciduous M1 with maxilla fragment, 3 upper molars, 1 lower P1, 2 molar fragments, 6 vertebrae fragments, 1 rib fragment, 1 humerus fragment, 1 radius fragment, 1 1st metacarpal, 1 2nd metacarpal, 1 proximal phalanx of hand, 1 ischium, 1 femur fragment, 1 distal phalanx of foot, 3 sesamoids, 104 fragments

Level 4 (30-40 cm): 12 skull fragments, 1 upper P2, 1 lower P1, 8 vertebrae fragments, 7 rib fragments, 1 scapula fragment, 1 radius fragment, 1 triquetral, 1 scaphoid, 1 trapezium, 2 proximal phalanges of hand, 1 middle phalanx fragment of hand, 1 distal phalanx of hand, 1 phalanx fragment of hand, 1 1st (medial) cuneiform fragment, 2 proximal phalanx fragments of foot, 72 fragments

Level 5 (40-60 cm): 2 skull fragments, 1 upper M2, 1 molar fragment, 3 vertebrae fragments, 7 rib fragments, 1 scapula fragment, 2 humerus fragments, 1 hamate, 1 proximal phalanx of hand, 1 proximal phalanx fragment, 1 sesamoid, 41 fragments

Level 6 (60-70 cm): 7 skull fragments, 1 lower P1, 1 lower premolar (extremely worn), 1 lower M1, 3 vertebrae fragments, 5 rib fragments, 1 clavicle fragment, 1 scapula fragment, 1 trapezoid, 1 distal phalanx of hand, 1 phalanx fragment of foot, 48 fragments

Table B.2 cont.

Level 7 (70-80 cm): 6 skull fragments, 1 mandible fragment, 1 upper I1, 1 deciduous upper canine, 1 tooth fragment, 7 vertebrae fragments, 2 rib fragments, 1 tibia fragment, 1 2nd metatarsal, 1 4th metatarsal, 2 proximal phalanges of foot, 1 middle phalanx of foot, 58 fragments

Level 8 (80-90 cm): 3 skull fragments, 1 upper P1, 1 upper P2, 1 upper molar fragment, 1 deciduous molar fragment, 5 vertebrae fragments, 1 rib fragment, 1 clavicle fragment, 1 scapula fragment, 1 fibula fragment, 1 3rd metatarsal fragment, 1 proximal phalanx fragment of foot, 93 fragments

Level 9 (90-100 cm): 3 skull fragments, 1 lower M1, 1 lower premolar (extremely worn), 1 mandible fragment, 1 thoracic vertebra, 10 vertebrae fragments, 1 rib fragment, 1 scaphoid, 1 lunate, 1 triquetral, 1 ilium fragment, 1 pubis fragment, 1 metapoidal fragment, 1 middle phalanx of foot, 62 fragments

Level 10 (100-120 cm): 2 skull fragments, 1 mandible fragment, 1 upper I1, 1 upper canine, 1 upper P1, 1 upper P2, 1 lower deciduous M2, 7 vertebrae fragments, 2 rib fragments, 2 scapula fragments, 1 2nd metacarpal, 2 middle phalanges of hand, 1 proximal phalanx of foot, 90 fragments

Level 11 (120-140 cm): 1 rib fragment, 1 middle phalanx of foot, 26 fragments

<u>Unit 9</u>

Level 1 (0-10 cm): 1 tooth fragment, 17 fragments

Level 2 (10-20 cm): 2 skull fragments, 1 upper I1, 1 M3 fragment, 3 rib fragments, 2 scapula fragments, 37 fragments

Level 3 (20-30 cm): 1 lower deciduous canine, 1 lower canine, 1 lower M1, 1 upper M1, 1 fibula fragment, 9 fragments

Level 4 (30-40 cm): 1 upper deciduous M1, 1 fragment

Level 5 (40-50 cm): 1 tooth fragment, 1 fragment

Table B.3

Vertebrate Faunal Assemblage: 25HN12

<u>Pedioecetes phaseanellus</u> (Sharp-tailed Grouse)
  Unit 4, Level 1 (0-15 cm): 1 ulna fragment
  Feature 1: 1 pelvis fragment

<u>Zenaidura macroura</u> (Mourning Dove)
  Feature 1: 1 coracoid

<u>Sylvilagus</u> sp. (Cottontail)
  Feature 1: 6 skull fragments, 6 lumbar vertebrae fragments, 1 ulna, 1 ulna fragment, 1 radius, 1 radius fragment, 4 femur fragments, 4 tibia fragments, 2 calcanea, 1 astragalus, 3 metatarsals, 1 metatarsal fragment

Indeterminate Mammal
  Feature 1: 1 fragment

Table B.4

Vertebrate Faunal Assemblage: 25HN16

<u>Castoroides ohionensis</u> (Giant Beaver)
  Beach: 1 femur fragment

<u>Camelidae</u> (Camels, Llamas)
  Beach: 1 calcaneum, 1 metatarsal fragment

<u>Bison</u> sp. (Bison)
  Beach: 1 radius fragment

Indeterminate Mammal
  Beach: 3 fragments

Table B.5

Vertebrate Faunal Assemblage: 25HN31

Peromyscus sp. (White-footed Mice)
  Unit 4, Level 1 (0-10 cm): 1 mandible

Unidentified Cricetid
  Unit 7, Level 2 (10-20 cm): 1 pelvis fragment

Equus sp. (Horse)
  Beach: 1 phalanx fragment

Odocoileus sp. (Deer)
  Unit 2, Level 2 (10-20 cm): 1 skull fragment

Bison-size
  Beach: 1 rib fragment
  Unit 8, Level 2 (10-20 cm): 1 rib fragment

Indeterminate Mammal
  Beach: 1 fragment
  Unit 1, Level 2 (10-20 cm): 3 fragments
          Level 3 (20-30 cm): 3 fragments
  Unit 6, Level 2 (10-20 cm): 2 fragments
          Level 3 (20-30 cm): 1 fragment
          Level 4 (30-40 cm): 3 fragments
          Level 7 (60-70 cm): 1 fragment
  Unit 7, Level 1 (0-10 cm): 2 fragments
          Level 2 (10-20 cm): 2 fragments
          Level 3 (20-30 cm): 3 fragments
          Level 4 (30-40 cm): 1 fragment
  Unit 8, Level 2 (10-20 cm): 2 fragments
          Level 3 (20-30 cm): 9 fragments
  Backhoe Trench: 2 fragments

Table B.6

Vertebrate Faunal Assemblage: 25HN32

Indeterminate Mammal
  Unit 2, Level 1 (0-10 cm): 1 fragment
  Unit 4, Level 2 (20-30 cm): 1 fragment

Table B.7

Vertebrate Faunal Assemblage: 25HN33

Microtus ochrogaster (Prairie Vole)
Unit 4, Level 1 (0-10 cm): 2 mandibles

Bison/Elk-size
Beach: 1 rib fragment

Indeterminate Mammal
Unit 1, Level 1 (0-10 cm): 1 fragment

Table B.8

Human Skeletal Remains: 25HN36

Unit 3
Level 3 (20-30 cm): 1 occipital fragment

Unit 5
Level 8 (70-80 cm): 1 molar (extremely worn)

Unit 6
Level 2 (10-20 cm): 1 lower molar (extremely worn)

Table B.9

Vertebrate Faunal Assemblage: 25HN36

cf. *Scaphirhynchus platorynchus* (?Shovel-nosed Sturgeon)
Unit 5, Level 2 (10-20 cm): 1 fish scale

Lepisosteus sp. (Gar)
Unit 4, Level 4 (30-40 cm): 1 skull fragment
Unit 5, Level 1 (0-10 cm): 1 skull fragment

Ictalurus punctatus (Channel Catfish)
Unit 3, Level 2 (10-20 cm): 1 supraethmoid
Unit 5, Level 2 (10-20 cm): 1 pectoral spine

Ictalurus sp. (Catfish)
Unit 3, Level 1 (0-10 cm): 1 cleithrum fragment
Level 2: (10-20 cm): 1 cleithrum fragment, 1 vertebra fragment
Level 4 (30-40 cm): 1 ceratohyal
Unit 4, Level 1 (0-10 cm): 1 articulated ceratohyal and epihyal, 1 articular fragment
Level 2, (10-20 cm): 1 hyomandibular fragment
Level 3, (20-30 cm): 1 vertebra
Unit 5, Level 1 (0-10 cm): 1 dentary
Level 3 (20-30 cm): 1 supracleithrum, 2 hyomandibular fragments
Level 4 (30-40 cm): 1 articulated ceratohyal and epihyal
Unit 6, Level 1 (0-10 cm): 2 vertebrae, 1 cleithrum fragment

Indeterminate Fish
Unit 3, Level 1 (0-10 cm): 1 fragment
Level 2 (10-20 cm): 4 fragments
Level 3 (20-30 cm): 2 vertebrae
Level 6 (50-60 cm): 1 fragment
Unit 4, Level 1 (0-10 cm): 3 fragments
Level 2 (10-20 cm): 1 fragment
Level 3 (20-30 cm): 1 fragment
Unit 5, Level 1 (0-10 cm): 4 fragments
Level 2 (10-20 cm): 1 dentary fragment, 1 epihyal, 2 fragments
Level 3 (20-30 cm): 1 fragment
Unit 6, Level 1 (0-10 cm): 1 vertebra, 4 fragments
Level 2 (10-20 cm): 1 coracoid fragment, 1 hyomandibular, 1 operculum fragment
Level 4 (30-40 cm): 1 operculum fragment, 3 fragments

Table B.9 cont.

Ranidae (Frogs)
  Unit 6, Level 2 (10-20 cm): 1 tibio-fibula fragment

Chelydra serpentina (Northern Snapping Turtle)
  Unit 3, Level 3 (20-30 cm): 1 coracoid fragment
  Unit 4, Level 2 (10-20 cm): 1 vertebra
  Unit 5, Level 2 (10-20 cm): 1 vertebra fragment
    Level 3 (20-30 cm): 1 carapace fragment
    Level 4 (30-40 cm): 1 femur
  Unit 6, Level 1 (0-10 cm): 1 scapula fragment

cf. Chelydra serpentina (?Northern Snapping Turtle)
  Unit 4, Level 2 (10-20 cm): 1 caudal vertebra
  Unit 5, Level 1 (0-10 cm): 1 caudal vertebra
    Level 5 (40-50 cm): 1 fibula
    Level 8 (70-80 cm): 1 vertebra fragment

Kinosternon flavescens (Plains Yellow Mud Turtle)
  Unit 5, Level 2 (10-20 cm): 1 pelvis fragment
    Level 3 (20-30 cm): 1 vertebra fragment

cf. Kinosternon flavescens (?Plains Yellow Mud Turtle)
  Unit 6, Level 4, (30-40 cm): 1 vertebra fragment

Terrapene ornata (Ornate Box Turtle)
  Unit 3, Level 1 (0-10 cm): 2 carapace fragments, 2 plastron fragments, 1 humerus, 1 tibia
    Level 2 (10-20 cm): 1 carapace fragment
    Level 4 (30-40 cm): 1 carapace fragment
    Level 5 (40-50 cm): 1 nuchal fragment, 1 plastron fragment
    Level 6 (50-60 cm): 1 plastron fragment
    Level 7 (60-70 cm): 1 plastron fragment
  Unit 4, Level 1 (0-10 cm): 1 plastron fragment
    Level 3 (20-30 cm): 1 carapace fragment
  Unit 5, Level 1 (0-10 cm): 3 plastron fragments
    Level 2 (10-20 cm): 1 carapace fragment, 1 plastron fragment, 1 humerus
    Level 4 (30-40 cm): 1 plastron fragment, 1 radius, 1 ilium
    Level 5, (40-50 cm): 1 carapace fragment
    Level 7 (60-70 cm): 1 plastron fragment
  Unit 6, Level 1 (0-10 cm): 1 carapace fragment
    Level 2 (10-20 cm): 2 plastron fragments

Table B.9 cont.

Chrysemys picta (Western Painted Turtle)
Unit 3, Level 1 (0-10 cm): 1 nuchal fragment
Level 2 (10-20 cm): 1 carapace fragment, 1 humerus fragment
Unit 4, Level 1 (0-10 cm): 1 plastron fragment
Level 4 (30-40 cm): 1 plastron fragment
Unit 5, Level 1 (0-10 cm): 1 plastron fragment
Level 3 (20-30 cm): 1 plastron fragment
Unit 6, Level 1 (0-10 cm): 1 ilium
Level 2 (10-20 cm): 2 plastron fragments, 1 tibia

Trionyx muticus (Midland Smooth Softshell Turtle)
Unit 5, Level 7 (60-70 cm): 1 pubis fragment
Unit 6, Level 3 (20-30 cm): 1 plastron fragment

Trionyx sp. (Softshell Turtle)
Unit 3, Level 1 (0-10 cm): 1 pubis, 1 ischium fragment
Level 2 (10-20 cm): 1 carapace fragment
Level 3 (20-30 cm): 1 plastron fragment, 1 humerus fragment
Level 4 (30-40 cm): 1 carapace fragment
Unit 4, Level 2 (10-20 cm): 4 carapace fragments, 1 pubis fragment
Level 3 (20-30 cm): 5 shell fragments
Level 4 (30-40 cm): 1 carapace fragment
Unit 5, Level 2 (10-20 cm): 2 carapace fragments
Level 3 (20-30 cm): 4 carapace fragments
Level 4 (30-40 cm): 1 vertebra fragment
Unit 6, Level 1 (0-10 cm): 2 carapace fragments, 1 plastron fragment, 1 tibia fragment
Level 2 (10-20 cm): 2 carapace fragments, 1 plastron fragment, 1 pubis fragment
Level 3 (20-30 cm): 1 carapace fragment

Indeterminate Turtle
Unit 3, Level 1 (0-10 cm): 50 shell fragments
Level 2 (10-20 cm): 8 shell fragments
Level 3 (20-30 cm): 6 carapace fragments
Level 4 (30-40 cm): 1 carapace fragment
Level 5 (40-50 cm): 2 carapace fragments
Unit 4, Level 1 (0-10 cm): 7 carapace fragments, 1 cervical vertebra, 1 scapula fragment
Level 2 (10-20 cm): 11 shell fragments
Level 3 (20-30 cm): 5 carapace fragments
Level 4 (30-40 cm): 5 carapace fragments

Unit 5, Level 1 (0-10 cm): 18 shell fragments, 1 vertebra fragment
Level 2 (10-20 cm): 14 shell fragments
Level 3 (20-30 cm): 4 shell fragments
Level 4 (30-40 cm): 2 plastron fragments, 1 scapula fragment, 1 ischium fragment
Level 8 (70-80 cm): 1 carapace fragment
Unit 6, Level 1 (0-10 cm): 12 shell fragments, 1 humerus fragment
Level 2 (10-20 cm): 6 carapace fragments
Level 3 (20-30 cm): 5 carapace fragments
Level 4 (30-40 cm): 4 carapace fragments

Elaphe obsoleta (Black Rat Snake)
Unit 3, Level 2 (10-20 cm): 2 vertebrae
Level 5 (40-50 cm): 1 vertebra
Unit 4, Level 2 (10-20 cm): 2 vertebra
Unit 5, Level 1 (0-10 cm): 1 vertebra
Level 4 (30-40 cm): 1 vertebra
Level 5 (40-50 cm): 3 vertebrae
Level 7 (60-70 cm): 2 vertebrae

cf. Elaphe obsoleta (?Black Rat Snake)
Unit 6, Level 4 (30-40 cm): 1 vertebra fragment

Branta canadensis (Canada Goose)
Unit 5, Level 3 (20-30 cm): 1 ulna fragment, 1 radius fragment

cf. Chen caerulescens (?Snow Goose)
Unit 6, Level 2 (10-20 cm): 1 ulna fragment

cf. Anas acuta (?Pintail)
Unit 3, Level 1 (0-10 cm): 1 coracoid fragment
Unit 4, Level 1 (0-10 cm): 1 scapula fragment
Unit 6, Level 1 (0-10 cm): 1 mandible fragment, 1 tibiotarsus fragment
Level 2 (10-20 cm): 1 carpometacarpus fragment
Level 3 (20-30 cm): 1 furcula fragment
Level 4 (30-40 cm): 1 scapula fragment

Anas discors (Blue-winged Teal)
Unit 5, Level 6 (50-60 cm): 1 carpometacarpus fragment

Anas clypeata (Northern Shoveler)
Unit 5, Level 5 (40-50 cm): 1 furcula fragment
Unit 6, Level 3 (20-30 cm): 1 furcula fragment

Table B.9 cont.

cf. _Anas clypeata_ (?Northern Shoveler)
Unit 5, Level 2 (10-20 cm): 1 humerus fragment

Anas sp. (Duck)
Unit 3, Level 1 (0-10 cm): 1 coracoid fragment
Unit 4, Level 2 (10-20 cm): 1 coracoid
Unit 5, Level 1 (0-10 cm): 1 humerus fragment
Unit 6, Level 1 (0-10 cm): 1 coracoid fragment

Lophodytes cucullatus (Hooded Merganser)
Unit 4, Level 3 (20-30 cm): 1 scapula fragment

cf. _Lophodytes cucullatus_ (?Hooded Merganser)
Unit 6, Level 1 (0-10 cm): 1 sternum fragment

Buteo lagopus (Rough-legged Hawk)
Unit 6, Level 2 (10-20 cm): 1 carpometacarpus fragment

cf. _Buteo lagopus_ (?Roughed-legged Hawk)
Unit 6, Level 4 (30-40 cm): 1 fragment of 1st phalanx of 2nd digit of wing

Pedioecetes phasianellus (Sharp-tailed Grouse)
Unit 5, Level 1 (0-10 cm): 1 humerus

Fulica americana (American Coot)
Unit 4, Level 1 (0-10 cm): 1 coracoid

Passeriformes (Perching Birds)
Unit 6, Level 4 (30-40 cm): 1 tarsometatarsus fragment

Indeterminate Bird
Unit 3, Level 3 (20-30 cm): 1 femur fragment
Level 4 (30-40 cm): 1 carpometacarpus fragment
Level 5 (40-50 cm): 1 carpometacarpus
Unit 4, Level 1 (0-10 cm): 1 ulna fragment
Level 2 (10-20 cm): 1 tarsometatarsus fragment
Level 4 (30-40 cm): 1 tarsometatarsus fragment
Unit 5, Level 1 (0-10 cm): 1 fragment
Level 2 (10-20 cm): 1 carpometacarpus fragment
Level 3 (20-30 cm): 1 tarsometatarsus fragment, 1 long bone fragment
Level 4 (30-40 cm): 1 humerus fragment, 2 long bone fragments
Level 8 (70-80 cm): 1 long bone fragment
Unit 6, Level 1 (0-10 cm): 1 bill fragment, 1 long bone fragment, 4 fragments
Level 2 (10-20 cm): 2 carpometacarpus fragments, 2 fragments

Table B.9 cont.

<u>Sylvilagus</u> sp. (Cottontail)

Unit 3, Level 1 (0-10 cm): 1 maxillary tooth, 1 premaxilla fragment, 1 mandible fragment with teeth, 1 rib fragment, 2 scapula fragments, 2 humerus fragments, 1 radius fragment, 1 ulna fragment, 1 ilium fragment, 1 femur fragment, 1 tibia fragment, 1 astragalus

Level 2 (10-20 cm): 1 mandible fragment with tooth, 1 lumbar vertebra fragment, 1 humerus fragment, 1 ischium fragment, 1 tibia fragment

Level 3 (20-30 cm): 1 mandible fragment with tooth, 1 calcaneum, 1 astragalus

Level 4 (30-40 cm): 2 tibia fragments

Level 5 (40-50 cm): 1 tibia fragment

Level 6 (50-60 cm): 1 calcaneum

Unit 4, Level 1 (0-10 cm): 1 frontal fragment, 1 auditory bulla fragment, 1 petrous, 1 mandible fragment with teeth

Level 2 (10-20 cm): 1 radius fragment, 2 femur fragments, 1 tibia fragment

Level 3 (20-30 cm): 1 squamosal, 2 lumbar vertebrae

Unit 5, Level 1 (0-10 cm): 1 frontal fragment, 1 parietal, 1 premaxilla fragment, 1 maxillary tooth fragment, 1 mandible fragment with teeth, 1 rib fragment, 1 scapula fragment, 3 humerus fragments, 1 carpal, 1 tibia fragment, 1 4th metatarsal, 1 proximal phalanx

Level 2 (10-20 cm): 1 jugal fragment, 1 maxilla, 2 maxillary teeth, 1 mandible fragment, 1 radius fragment, 1 pelvis fragment, 1 femur fragment, 1 tibia fragment, 1 calcaneum, 3 metatarsal fragments

Level 3 (20-30 cm): 1 mandible fragment with teeth, 1 humerus fragment, 2 tibia fragments

Level 4 (30-40 cm): 1 squamosal fragment, 1 maxillary tooth, 1 mandible fragment with teeth, 1 mandibular tooth, 1 radius fragment, 1 ulna fragment, 1 tibia fragment

Level 5 (40-50 cm): 1 premaxilla with tooth, 1 radius fragment

Level 6 (50-60 cm): 1 ulna fragment

Unit 6, Level 1 (0-10 cm): 1 jugal fragment, 1 petrous, 1 misc. skull fragment, 1 mandible fragment with teeth, 1 mandibular tooth, 1 thoracic vertebra, 1 lumbar vertebra fragment, 1 humerus fragment, 2 femur fragments, 1 calcaneum, 1 calcaneum fragment, 1 3rd metatarsal fragment, 1 5th metatarsal

Table B.9 cont.

Level 2 (10-20 cm): 1 jugal fragment, 1 maxilla fragment with tooth, 4 mandible fragments with teeth, 1 mandibular tooth fragment, 1 rib fragment, 1 humerus fragment, 1 4th metacarpal, 3 femur fragments, 1 tibia fragments, 1 3rd metatarsal

Level 3 (20-30 cm): 1 frontal fragment, 1 mandible fragment with teeth, 1 radius, 2 radius fragments

Level 4 (30-40 cm): 1 cervical vertebra fragment, 1 rib fragment, 1 radius fragment

Lepus sp. (Jack Rabbit)

Unit 3, Level 1 (0-10 cm): 1 4th metatarsal fragment
Unit 4, Level 2 (10-20 cm): 1 radius fragment
Unit 5, Level 2 (10-20 cm): 1 4th metatarsal
Level 4 (30-40 cm): 1 radius fragment
Level 5 (40-50 cm): 1 femur fragment, 1 4th metatarsal fragment
Unit 6, Level 1 (0-10 cm): 1 mandibular tooth fragment, 1 lumbar vertebra fragment, 1 ulna fragment
Level 2 (10-20 cm): 1 carpal, 1 carpal or tarsal, 1 calcaneum, 1 2nd metatarsal, 2 metatarsal fragments
Level 3 (20-30 cm): 1 scapula fragment
Level 4 (30-40 cm): 1 scapula fragment

cf. _Lepus_ sp. (?Jack Rabbit)

Unit 6, Level 3 (20-30 cm): 1 rib fragment
Level 4 (30-40 cm): 1 rib fragment

Spermophilus tridecemlineatus (13-lined Ground Squirrel)

Unit 3, Level 1 (0-10 cm): 1 pelvis fragment

Cynomys ludovicianus (Black-tailed Prairie Dog)

Unit 3, Level 1 (0-10 cm): 1 auditory bulla
Level 2 (10-20 cm): 1 petrous fragment
Level 3 (20-30 cm): 1 humerus fragment
Unit 5, Level 7 (60-70 cm): 1 pelvis

Geomys bursarius (Plains Pocket Gopher)

Unit 3, Level 1 (1-10 cm): 1 mandible fragment with teeth, 1 femur fragment
Level 2 (10-20 cm): 1 ulna, 1 femur fragment
Unit 4, Level 1 (0-10 cm): 1 ulna
Unit 5, Level 1 (0-10 cm): 1 mandible fragment with tooth, 1 mandibular tooth
Level 2 (10-20 cm): 1 maxilla fragment with teeth, 4 maxillary teeth, 1 mandible fragment, 1 mandibular tooth, 1 radius, 1 ulna fragment
Level 3 (20-30 cm): 1 femur
Level 5 (40-50 cm): 1 radius
Unit 6, Level 4 (30-40 cm): 1 ulna fragment

Table B.9 cont.

Castor canadensis (Beaver)
Unit 3, Level 1 (0-10 cm): 1 scapula fragment, 1 tibia fragment, 1 proximal phalanx
Level 2 (10-20 cm): 1 maxillary tooth, 1 scapula fragment
Level 3 (20-30 cm): 1 caudal vertebra fragment
Level 4 (30-40 cm): 1 femur fragment
Unit 4, Level 2 (10-20 cm): 1 thoracic vertebra
Level 3 (20-30 cm): 1 humerus, 1 ulna
Unit 5, Level 1 (0-10 cm): 1 lumbar vertebra fragment
Level 2 (10-20 cm): 1 1st metatarsal
Unit 6, Level 1 (0-10 cm): 1 caudal vertebra fragment
Level 2 (10-20 cm): 1 caudal vertebra, 1 rib fragment
Level 3 (20-30 cm): 1 middle phalanx

Microtus ochrogaster (Prairie Vole)
Unit 3, Level 1 (0-10 cm): 2 mandible fragments with teeth
Unit 4, Level 1 (0-10 cm): 1 mandible fragment with tooth
Level 2 (10-20 cm): 1 mandible fragment with teeth
Unit 5, Level 1 (0-10 cm): 3 mandible fragments with teeth

cf. Ondatra zibethicus (?Muskrat)
Unit 3, Level 2 (10-20 cm): 1 caudal vertebra

Indeterminate Rodent
Unit 3, Level 6 (50-60 cm): 1 skull fragment
Unit 4, Level 3 (20-30 cm): 1 tooth fragment
Unit 5, Level 3 (20-30 cm): 1 mandibular tooth
Unit 6, Level 1 (0-10 cm): 1 mandible fragment

Canis latrans (Coyote)
Unit 3, Level 1 (0-10 cm): 1 axis vertebra fragment
Level 2 (10-20 cm): 1 mandibular carnassial (M1)

Canis cf. latrans (?Coyote)
Unit 3, Level 1 (0-10 cm): 1 metapodial fragment
Level 2 (10-20 cm): 1 tibia fragment
Level 3 (20-30 cm): 1 mandibular tooth, 1 lumbar vertebra
Level 4 (30-40 cm): 1 tibia fragment
Unit 4, Level 2 (10-20 cm): 1 humerus fragment, 1 proximal phalanx fragment
Unit 5, Level 1 (0-10 cm): 1 lumbar vertebra
Level 2 (10-20 cm): 1 4th metacarpal fragment, 1 distal phalanx
Level 6 (50-60 cm): 1 proximal phalanx
Unit 6, Level 4 (30-40 cm): 3 vertebra fragments, 1 rib fragment

Table B.9 cont.

Vulpes velox (Swift Fox)
Unit 3, Level 2 (10-20 cm): 1 premaxilla fragment
Unit 5, Level 2 (10-20 cm): 1 calcaneum
Unit 6, Level 1 (0-10 cm): 1 mandible fragment with tooth, 1 axis vertebra fragment

Procyon lotor (Raccoon)
Unit 6, Level 1 (0-10 cm): 1 4th metacarpal, 1 astragalus

Raccoon-size
Unit 3, Level 2 (10-20 cm): 1 caudal vertebra, 1 proximal phalanx
Unit 5, Level 1 (0-10 cm): 1 rib fragment
Level 2 (10-20 cm): 1 metapodial fragment, 1 caudal vertebra, 1 proximal phalanx
Unit 6, Level 3 (20-30 cm): 2 vertebra fragments

Odocoileus sp. (Deer)
Unit 3, Level 1 (0-10 cm): 2 rib fragments, 1 femur fragment, 1 astragalus fragment, 1 distal phalanx of dew claw
Level 2 (10-20 cm): 1 unciform
Level 3 (20-30 cm): 1 lumbar vertebra fragment, 1 naviculo-cuboid
Level 4 (30-40 cm): 1 antler fragment
Level 6 (50-60 cm): 1 maxillary tooth fragment, 2 lumbar vertebra fragments
Unit 4, Level 1 (0-10 cm): 1 skull fragment, 1 middle phalanx fragment
Level 2 (10-20 cm): 1 lumbar vertebra fragment
Level 3 (20-30 cm): 1 metatarsal fragment
Level 4 (30-40 cm): 1 antler fragment, 2 skull fragments, 1 thoracic vertebra fragment, 1 scaphoid, 1 femur fragment

Unit 5, Level 1 (0-10 cm): 1 pisiform fragment, 1 ilium fragment, 1 proximal phalanx, 1 distal phalanx of dew claw
Level 2 (10-20 cm): 1 antler fragment, 1 skull fragment, 1 scapula fragment, 1 metapodial fragment, 1 proximal phalanx and 1 distal phalanx of dew claw
Level 3 (20-30 cm): 1 humerus fragment
Unit 6, Level 2 (10-20 cm): 1 metacarpal fragment
Level 3 (20-30 cm): 1 distal phalanx, 1 proximal phalanx and 1 distal phalanx of dew claw
Level 4 (30-40 cm): 1 lunar

Table B.9 cont.

<u>Antilocapra americana</u> (Pronghorn)
Unit 3, Level 1 (0-10 cm): 1 femur fragment, 1 distal phalanx fragment, 2 sesamoids
Level 2 (10-20 cm): 1 calcaneum fragment
Unit 4, Level 1 (0-10 cm): 1 distal phalanx
Level 2 (10-20 cm): 1 distal phalanx
Level 3 (20-30 cm): 1 patella
Unit 5, Level 1 (0-10 cm): 1 cuneiform, 1 lateral malleolus
Level 3 (20-30 cm): 1 distal phalanx, 1 distal phalanx fragment
Level 4 (30-40 cm): 1 middle phalanx
Level 6 (50-60 cm): 1 humerus fragment
Unit 6, Level 1 (0-10 cm): 1 mandibular tooth, 1 distal phalanx
Level 2 (10-20 cm): 3 sesamoids
Level 4 (30-40 cm): 1 sesamoid

Deer/Pronghorn
Unit 3, Level 1 (0-10 cm): 1 skull fragment, 1 proximal phalanx fragment
Level 2 (10-20 cm): 1 skull fragment, 1 tooth fragment
Level 3 (20-30 cm): 1 scapula fragment
Level 4 (30-40 cm): 2 tooth fragments, 1 rib fragment, 1 ulna fragment
Level 5 (40-50 cm): 1 femur fragment, 1 metatarsal fragment
Unit 4, Level 1 (0-10 cm): 1 mandible fragment, 1 radius fragment, 2 metatarsal fragments, 1 middle phalanx fragment
Level 2 (10-20 cm): 1 metatarsal fragment
Level 3 (20-30 cm): 2 tooth fragments, 1 thoracic vertebra fragment, 1 radius fragment, 2 metatarsal fragments
Unit 5, Level 1 (0-10 cm): 1 scapula fragment, 1 ulna fragment
Level 2 (10-20 cm): 1 tooth fragment, 1 radius fragment, 1 metacarpal fragment
Level 3 (20-30 cm): 2 tooth fragments, 1 trapezoid-magnum fragment, 1 metatarsal fragment, 1 proximal phalanx fragment
Level 6 (50-60 cm): 2 metacarpal fragments
Unit 6, Level 1 (0-10 cm): 2 tooth fragments, 1 thoracic vertebra fragment, 1 lumbar vertebra fragment, 1 ulna fragment, 1 pelvis fragment, 1 metapodial fragment, 1 proximal phalanx fragment, 1 middle phalanx fragment

Table B.9 cont.

Level 2 (10-20 cm): 1 mandible fragment, 1 tooth fragment, 1 cervical vertebra fragment, 1 thoracic vertebra fragment, 1 rib fragment, 1 femur fragment, 1 proximal phalanx fragment, 1 middle phalanx fragment
Level 3 (20-30 cm): 1 humerus fragment

Deer-size
Unit 3, Level 1 (0-10 cm): 3 rib fragments, 1 metatarsal fragment
Level 2 (10-20 cm): 3 rib fragments
Level 3 (20-30 cm): 1 vertebra fragment, 1 rib fragment, 1 radius fragment
Level 4 (30-40 cm): 1 rib fragment
Level 7 (60-70 cm): 1 tibia fragment
Unit 4, Level 2 (10-20 cm): 1 thoracic vertebra fragment, 1 metapodial fragment
Level 3 (20-30 cm): 1 rib fragment, 1 long bone fragment
Level 4 (30-40 cm): 3 rib fragments
Unit 5, Level 1 (0-10 cm): 2 tooth fragments, 3 vertebra fragments
Level 2 (10-20 cm): 1 vertebra fragment, 2 rib fragments, 1 scapula fragment, 1 femur fragment
Level 3 (20-30 cm): 1 pelvis fragment, 1 sesamoid
Level 4 (30-40 cm): 1 tooth fragment, 1 rib fragment
Level 5 (40-50 cm): 2 vertebra fragments, 1 rib fragment, 1 ulna fragment, 1 femur fragment
Level 7 (60-70 cm): 1 rib fragment, 2 awl fragments
Level 8 (70-80 cm): 1 mandible fragment
Unit 6, Level 1 (0-10 cm): 3 vertebra fragments, 2 rib fragments, 1 radius fragment
Level 2 (10-20 cm): 4 vertebra fragments, 1 rib fragment, 1 ulna fragment, 1 femur fragment
Level 3 (20-30 cm): 1 petrous fragment, 2 vertebra fragments, 1 awl fragment
Level 4 (30-40 cm): 1 skull fragment

Bison bison (Bison)
Unit 3, Level 3 (20-30 cm): 1 petrous, 1 thoracic vertebra fragment
Unit 4, Level 2 (10-20 cm): 1 skull fragment
Level 4 (30-40 cm): 1 mandible fragment

Bison/Elk
Unit 4, Level 2 (10-20 cm): 1 scapula fragment
Level 3 (20-30 cm): 1 scapula fragment

Table B.9 cont.

Indeterminate Mammal		
Surface: 8 fragments		
Unit 1,	Level 1 (0-10 cm):	1 fragment
Unit 3,	Level 1 (0-10 cm):	178 fragments
	Level 2 (10-20 cm):	106 fragments
	Level 3 (20-30 cm):	66 fragments
	Level 4 (30-40 cm):	29 fragments
	Level 5 (40-50 cm):	24 fragments
	Level 6 (50-60 cm):	16 fragments
	Level 7 (60-70 cm):	3 fragments
Unit 4,	Level 1 (0-10 cm):	89 fragments
	Level 2 (10-20 cm):	51 fragments
	Level 3 (20-30 cm):	47 fragments
	Level 4 (30-40 cm):	30 fragments
Unit 5,	Level 1 (0-10 cm):	160 fragments
	Level 2 (10-20 cm):	169 fragments
	Level 3 (20-30 cm):	82 fragments
	Level 4 (30-40 cm):	42 fragments
	Level 5 (40-50 cm):	25 fragments
	Level 6 (50-60 cm):	12 fragments
	Level 7 (60-70 cm):	10 fragments
	Level 8 (70-80 cm):	6 fragments
Unit 6,	Level 1 (0-10 cm):	146 fragments
	Level 2 (10-20 cm):	158 fragments
	Level 3 (20-30 cm):	56 fragments
	Level 4 (30-40 cm):	71 fragments

Table B.10

Vertebrate Faunal Assemblage: 25HN37

Aplodinotus grunniens (Freshwater Drum)
Unit 3, Level 1 (0-10 cm): 1 otolith

Unidentified Fish
Unit 2, Level 1 (0-10 cm): 2 operculums, 1 interoperculum, 1 vertebra

Canis familiaris (Dog) or C. lupus (Gray Wolf)
Beach: 1 canine fragment

Equus caballus (Domestic Horse)
Beach: 1 humerus fragment

Cervus canadensis (Wapiti/Elk)
Beach: 1 antler fragment, 2 molar fragments

Odocoileus sp. (Deer)
Beach: 1 anter fragment

Indeterminate Cervid
Beach: 1 antler fragment

Bison bison (Bison)
Beach: 1 atlas vertebra fragment, 2 thoracic vertebra fragments, 1 scapula fragment, 4 humerus fragments, 6 radius fragments, 1 ulna fragment, 2 pelvis fragments, 5 tibia fragments, 1 astragalus

Elk or Bison
Beach: 1 premolar fragment, 1 tooth fragment, 3 rib fragments, 3 humerus fragments, 1 radius fragment, 3 femur fragments, 3 tibia fragments, 1 metatarsal fragment
Unit 1, Level 2 (10-20 cm): 2 teeth fragments
Unit 2, Level 1 (0-10 cm): 1 tooth fragment

Indeterminate Mammal
Beach: 118 fragments
Unit 1, Level 2 (10-20 cm): 40 fragments
Level 3 (20-30 cm): 6 fragments
Unit 2, Level 2 (10-20 cm): 1 fragment
Unit 3, Level 2 (10-20 cm): 16 fragments
Feature 1: 8 fragments

Table B.11

Vertebrate Faunal Assemblage: 25HN39

Odocoileus sp. (Deer)
Unit 2, Level 1 (0-10 cm): 1 tooth fragment
Unit 3, Level 3 (20-30 cm): 1 skull fragment

Elk or Bison
Unit 1, Level 1 (0-10 cm): 1 tooth fragment

Indeterminate Mammal
Unit 1, Level 3 (20-30 cm): 2 fragments
Unit 2, Level 1 (0-10 cm): 2 fragments
Unit 3, Level 2 (10-20 cm): 3 fragments
Level 3 (20-30 cm): 3 fragments
Unit 4, Level 3 (20-30 cm): 2 fragments
Unit 5, Level 1 (0-10 cm): 1 fragment
Unit 6, Level 1 (0-10 cm): 2 fragments

Table B.12

Vertebrate Faunal Assemblage: 25HN40

Sylvilagus sp. (Cottontail)
Unit 1, Level 3 (20-30 cm): 1 tibia

cf. *Sylvilagus* sp. (?Cottontail)
Unit 1, Level 1 (0-10 cm): 1 femur fragment

Geomys bursarius (Plains Pocket Gopher)
Unit 2, Level 1 (0-10 cm): 1 mandible fragment

Antilocapra americana (Pronghorn)
Unit 1, Level 4 (30-40 cm): 1 femur fragment, 1 astragalus
Unit 4, Level 2 (10-20 cm): 1 pelvis fragment
Feature 1, 1 naviculo-cuboid, 1 phalanx

cf. *Antilocapra americana* (?Pronghorn)
Unit 1, Level 2 (10-20 cm): 1 lumbar vertebra fragment
Level 3 (20-30 cm): 1 thoracic vertebra fragment

Deer or Pronghorn
Unit 2, Level 1 (0-10 cm): 1 trapezoid-magnum fragment

Bison bison (Bison) or *Bos taurus* (Domestic Cow)
Beach: 1 tooth fragment

Indeterminate Mammal
Beach: 1 fragment
Surface: 1 fragment
Unit 1, Level 1 (0-10 cm): 1 fragment
Level 2 (10-20 cm): 1 fragment
Level 3 (20-30 cm): 4 fragments
Level 4 (30-40 cm): 7 fragments
Unit 2, Level 3 (20-30 cm): 4 fragments
Unit 3, Level 1 (0-10 cm): 4 fragments
Level 2 (10-20 cm): 7 fragments
Level 3 (20-30 cm): 3 fragments
Unit 4, Level 1 (0-10 cm): 8 fragments
Level 2 (10-20 cm): 8 fragments
Level 3 (20-30 cm): 13 fragments
Feature 1: 4 fragments

Table B.13

Vertebrate Faunal Assemblage: 25HN42

Ondatra zibethicus (Muskrat)
Unit 3, Level 2 (10-20 cm): 1 molar

Unidentified Rodent
Unit 5, Level 2 (10-20 cm): 3 vertebrae

Elk or Bison
Unit 3, Level 2 (10-20 cm): 1 tooth fragment
Unit 4, Level 2 (10-20 cm): 1 tooth fragment

Bison-size
Unit 5, Level 7 (60-70 cm): 1 sesamoid

Indeterminate Mammal

Unit 1,	Level 1 (0-10 cm):	8 fragments
Unit 3,	Level 1 (0-10 cm):	2 fragments
	Level 2 (10-20 cm):	9 fragments
	Level 3 (20-30 cm):	23 fragments
	Level 4 (30-40 cm):	1 fragment
Unit 4,	Level 1 (0-10 cm):	14 fragments
	Level 2 (10-20 cm):	1 fragment
Unit 5,	Level 1 (0-10 cm):	2 fragments
	Level 3 (20-30 cm):	3 fragments
	Level 4 (30-40 cm):	1 fragment
	Level 5 (40-50 cm):	1 fragment
	Level 7 (60-70 cm):	6 fragments

Table B.14

Vertebrate Faunal Assemblage: 25HN50

Geomys bursarius (Plains Pocket Gopher)
  Unit 1, Level 5 (40-50 cm): 1 mandible
          Level 6 (50-60 cm): 1 femur

Elk or Bison
  Unit 1, Level 1 (0-10 cm): 1 tooth fragment

Indeterminate Mammal
  Unit 1, Level 5 (40-50 cm): 3 fragments

Table B.15

Vertebrate Faunal Assemblage: 25HN51

Indeterminate Mammal
  Unit 4, Level 1 (0-10 cm): 1 fragment

Table B.16

Vertebrate Faunal Assemblage: 25HN54

Chen caerulescens (Snow Goose)
  Beach: 1 ulna

cf. Odocoileus sp. (?Deer)
  Beach: 1 rib

Bison sp. (Bison)
  Beach: 1 thoracic vertebra, 1 metacarpal fragment,
    1 femur fragment

Elk or Bison
  Beach: 1 scapula fragment, 1 metatarsal fragment

Proboscidea (Masodonts, Elephants)
  Beach: 1 fragment

Indeterminate Mammal
  Beach: 17 fragments

Table B.17

Vertebrate Faunal Assemblage: 25HN57

cf. _Cyprinus carpio_ (?Carp)
  Unit 2, Level 1 (0-10 cm): 1 skull fragment

cf. _Stizostedion vitreum_ (?Walleye)
  Unit 3, Level 1 (0-10 cm): 1 preocuperculum, 1 ceratohyal, 1 epihyal, 1 skull fragment

Branta canadensis (Canada Goose)
  Unit 3, Level 1 (0-10 cm): 1 phalanx of wing

Bison bison (Bison)
  Unit 1, Level 1 (0-15 cm): 1 phalanx

Indeterminate Mammal
  Unit 1, Level 1 (0-15 cm): 1 fragment
  Unit 4, Level 1 (0-10 cm): 2 fragments

Table B.18

Vertebrate Faunal Assemblage: 25HN61

cf. _Terrapene_ ornata (?Ornate Box Turtle)
  Surface: 3 carapace fragments, 2 plastron fragments

Table B.19

Vertebrate Faunal Assemblage: 25HN62

Microtus ochrogaster (Prairie Vole)
  Unit 2, Level 1 (0-10 cm): 1 skull fragment, 2 mandibles

cf. _Odocoileus_ sp. (Deer)
  Unit 8, Level 1 (0-10 cm): 1 axis vertebra fragment

Deer-size
  Unit 8, Level 1 (0-10 cm): 1 rib fragment

Bison-size
  Cut Bank: 1 rib fragment

Indeterminate Mammal
  Unit 7, Level 1 (0-10 cm): 5 fragments
          Level 2 (10-20 cm): 7 fragments
  Unit 8, Level 1 (0-10 cm): 70 fragments
          Level 2 (10-20 cm): 1 fragment

Table B.20

Vertebrate Faunal Assemblage: 25HN125

Geomys bursarius (Plains Pocket Gopher)
Unit 2, Level 7 (60-70 cm): 1 pelvis fragment, 1 femur
Level 8 (70-80 cm): 1 scapula, 1 humerus
Level 9 (80-90 cm): 1 femur fragment
Backhoe Trench: 2 incisors

Odocoileus sp. (Deer)
Unit 2, Level 8 (70-80 cm): 1 astragalus

Deer-size
Unit 2, Level 9 (80-90 cm): 1 scapula fragment

Bison-size
Unit 2, Level 10 (90-100 cm): 1 vertebra fragment

Indeterminate Mammal
Unit 1, Level 4 (30-40 cm): 1 fragment
Level 5 (40-50 cm): 1 fragment
Unit 2, Level 5 (40-50 cm): 1 fragment
Level 7 (60-70 cm): 2 fragments
Level 9 (80-90 cm): 1 fragment